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ENTRIES 1–576

BOTANICAL ABSTRACTS

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J. R. Schramm, Editor-in-Chief
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Vol. IX AUGUST, 1921 No. 1

ENTRIES 1-576

AGRONOMY

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(See also in this issue Entries 104, 111, 113, 115, 230, 257, 272, 276, 277, 279, 284, 285, 426, 427, 436, 440, 441, 450, 452, 481, 483, 486, 524, 525, 528, 530, 532, 533, 540, 546, 552, 555, 562, 568, 569, 570, 574)

1. Anonymous. **El abrojo grande.** [Cocklebur] Defensa Agric. [Uruguay] 1: 10-12. 1920.—*Xanthium* sp. as a weed.—*John A. Stevenson.*

2. Anonymous. **El maiz para semilla. Ventajes de la seleccion de las espigas.** [Seed corn. Advantages of selecting ears.] Defensa Agric. [Uruguay] 1: 295-300. *10 fig.* 1920.

3. Anonymous. **Field experiments, 1920.** Jour. Dept. Agric. Ireland 21: 53-68. 1921.—Average results are presented of: Variety tests with barley, potatoes, mangels, oats, turnips, and wheat; fertilizer tests with potatoes, mangels, oats, and wheat; cultural tests with potatoes; and weed-spraying tests in oats. Comparisons are made with previous year or years.—*Donald Folsom.*

4. Anonymous. **La papa y su cultivo.** [Potato culture.] Defensa Agric. [Uruguay] 1: 2-6. 1920.

5. Anonymous. **Potatoes.—Varieties immune from black scab or wart disease.** Jour. Dept. Agric. Ireland 21: 108-112. 1921.—Some immune varieties are satisfactory in regard to yield. Yield rate and immunity of a number of varieties are given.—*Donald Folsom.*

6. Anonymous. **Report of the work of the seed propagation division for 1920.** Jour. Dept. Agric. Ireland 21: 38-52. *Fig. 1-4.* 1921.—Results of pure-line culture and variety tests of wheat, oats, barley, and flax are described. Covered smut (*Ustilago hordei*) of barley was eliminated by steeping the seed for 10 minutes in a 5 per cent solution of formalin.—*Donald Folsom.*

7. Anonymous. **The non-setting of the uba seed.** South African Sugar Jour. 5: 131. 1921.—Success with cross pollinating flowers of sugar cane and raising of seed in Natal and Zululand cannot be expected with our present knowledge as the anthers appear to have lost the power to open. The pollen is remarkably scanty in the anthers; such pollen grains as are present are irregular in size and devoid of starch whereas normal cane pollen is spherical and rich in starch. From these latter facts the conclusion is drawn that the pollen is sterile.—*E. K. Tisdale.*

8. Anonymous. **The R. A. S. field wheat competition.** Agric. Gaz. New South Wales 32: 185-190. 1921.—Of 54 original competitors 24 voluntarily withdrew. Fields were scored according to trueness to type and purity, freedom from disease, evenness, cleanliness, condition and appearance, and apparent yield. A field of Hard Federation sown May 6 on summer fallow at 45 pounds per acre with no fertilizer won first place.—*L. R. Waldron.*

9. Arnold, J. H. **Farm practices in growing wheat.** U. S. Dept. Agric. Yearbook 1919: 123-150. *Pl. 5, 20 maps.* 1920.—A geographical presentation of farm practices in wheat growing in the U. S. A. The practices used in preparation of seed bed, sowing, harvesting and threshing, have a rather definite adjustment to areal factors of climate, soil, and topographic features. Local variation in factors causes an adaptation of methods. Practices suitable for any given areal conditions cannot be transplanted unmodified to another area but helpful suggestions may be secured.—*C. J. Shirk.*

10. Beckman. **Neuere Erfahrungen über Strohaufschliessung und Lupinenentbitterung.** [New experiments in treating straw and in removing the bitter principle from lupines.] Mitteil. Deutsch. Landw. Ges. 36: 145-146. 1921.—After a brief summary of the older attempts to treat straw to make of it a more digestible feed, the author describes his own method. The straw is treated with soda combined with hydrated lime. The process is carried on in a patented apparatus without artificial heat. This apparatus is described and an estimate of expenses given by an engineer, Baetke of Charlottenburg. Out of 100 kg. straw, 80 kg. "Beckman straw" are obtained, with a starch value of 56 kg. The details of the quantities of soda and lime are not given but Baetke claims that at a total expense of 70 M. for raw material and labor a feed worth 275 M. may be secured. To the costs should be added the royalty for the use of the patent, which is fixed at 70 M. per head of cattle payable once (einmalige Abgabe).—*A. J. Pieters.*

11. Bippart, E. **Erfahrungen in Ackerbau zur Überwindung der Kriegschäden für Gross- und Kleinbetrieb.** [Experiences in agriculture for overcoming war damages by large and small estates.] Landw. Hefte 44/45. *74 p., 4 fig.* 1920.—A series of agricultural essays by an experienced farmer. The subjects discussed are as follows: 1. Agricultural production. Nutrition of plants and their ingredients. 2. The difficulties of managing sandy lands and how to overcome them. 3. The difficulties of cattle raising on sandy land. 4. The management of moor lands and the Rimpau-Cunrau system. 5. Practical agriculture on stiff soils. 6. What results have the scientific investigators secured as regards fallowing? 7. How can the nitrogen requirement of winter grain on stiff land be met without manuring? 8. Soil bacteria. 9. Management of stiff soils without livestock. 10. The art of agriculture. 11. Practical rotations with fallow, clover, and hoed crops. 12. How can tillage be conducted to bring about a restoration of a brisk and strong soil fermentation. 13. Conclusion.—*C. V. Piper.*

12. Bovell, J. R. **Report on the Department of Agriculture, Barbados.** Rept. Dept. Agric. Barbados 1917-1918: 51 p. 1920.—From a summary of the results of experiments with sugar-canes during the period 1916–18 it appears that B. H. 10 (12), Ba. 6032, and Ba. 7924 have maintained a high standard of yield and that the newer seedlings, such as B. S. F. 12 (45), B. S. F. 12 (34), B. S. F. 12 (27), and B. S. F. 12 (24), are deserving of extended trials under plantation conditions. The results of manurial experiments with sugar-cane were rendered of little value by the attacks of *Diaprepes abbreviatus* L. and *Phytalus smithi* Arrow.—Two series of experiments with cotton are reported: (1) An effort to improve Sea Island and certain indigenous and other varieties of cotton by the selection of the best formed plants giving heavy yields of good-quality lint; (2) by similar means to improve a number of hybrid cottons obtained from crossing improved varieties with indigenous cottons.—The Barbados cassava (*Manihot utilissima*) seedling No. 101 gave a mean return per acre of 11,026 lbs. over a 5-year period. Results of experiments with Xanthosomas and Colocasias prove that better returns are obtained when the former are planted from corms and the latter from cormels. Variety experiments with a number of legumes, yams, and three fodder plants are also reported. Figures are given for the sugar and cotton crops.—*J. S. Dash.*

13. BREAKWELL, E. **Further reports on Shearman's clover.** Agric. Gaz. New South Wales 32: 167. 1921.—Kew authorities announce plant to be *Trifolium fragiferum* var. Notes on its behavior are given.—*L. R. Waldron.*

14. BREAKWELL, E. **Popular descriptions of grasses.** Agric. Gaz. New South Wales 32: 191-196. *3 fig.* 1921.—Descriptive notes are given of *Stipa setacea, S. scabra, Aristida Behriana,* and *A. leptopoda.* Other species are mentioned. Seeds of the 2 *Stipa* species germinate 48 hours after rains. The 2 grasses start very early after dormancy and resist drought in summer which makes them valuable for dry-land pastures.—*L. R. Waldron.*

15. BROOKS, A. J. **Report on the Agricultural Department, St. Lucia.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. St. Lucia 1918-19. 32 p. 1920.—Notes are given on: *Pyenostachys dawei,* a handsome blue-flowered labiate from Uganda, Guayaquil cacao, now in great demand on the British market and of which seeds have been received for trial; *Ilex paraguayensis,* extensively used as a tea plant in Paraguay; and *Nephelium lappaceum,* which bears the Rambutam,—a favorite fruit of the Malayan Archipelago.—It was found that *Dolichos hosei* was easily propagated by cutting off a few rooting branches and establishing them in clay pots. Upland, or Hill, rice gave satisfactory results and should become an important subsidiary crop. Maize of a St. Vincent strain yielded 3206 lbs. air-dried grain per acre. A large plot of the Gambia variety of ground nuts, gave a yield of 2643 lbs. cured nuts per acre.—Plant legislation includes measures to prevent the introduction of the mottling disease of sugarcanes, 'wither-tip' of lime trees caused by *Gloeosporium limetticolum,* and the red-ring disease of coconuts.—Progress of the following industries is reported on: Sugar, bay oil, rice, lime, coconut, bee-keeping, cacao, drugs, and spices. A list of the principal exports for the years 1916-18 inclusive is found on page 16. An account is also given of efforts to increase the quantity and improve the quality of locally-grown foodstuffs as a result of conditions imposed by the war.—*J. S. Dash.*

16. BRYCE, H. **Field experiments, 1920. Grafton experiment farm.** Agric. Gaz. New South Wales 32: 168-170. 1921.—In the wheat variety trial the varieties yielded in order as follows: Canberra, Marshall's No. 3, Thew, and Hard Federation.—In the winter-fodder trial Sunrise oats mixed with vetches and mixed with field peas gave the best yields, followed by Guyra oats mixed with legumes.—In winter-fodder manurial trial, superphosphate at rate of 200 lbs. per acre gave largest net-increase return.—*L. R. Waldron.*

17. BURT, R. C. **Flax in the United Provinces.** Agric. Jour. India 15: 616-619. 1920.—It is stated that experiments made at the Cawnpore Experimental Farm proved that flax can be successfully grown in the canal-irrigated tracts of the United Provinces. Both English and Japanese seed grew well.—*J. J. Skinner.*

18. CHEN, CHUNJEN C. **[The Pedigreed Seed Co.]** Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kan [China Cotton Jour.] 2^2: 245-250. *2 pl.* 1921.—[Text in Chinese.] The organization and management of the Pedigreed Seed Company, of Hartsville, South Carolina, are described. The method used by the company in cotton breeding is related at length with graph.—*Chunjen C. Chen.*

19. COLLENS, A. E., ET AL. **Sugar-cane experiment in the Leeward Islands. Report on experiments conducted in Antigua and St. Kitts-Nevis in the season 1918-19.** Imp. Dept. Agric. West Indies Rept. Sugar Exp. Leeward Islands 1918-19: 62 p. 1921.—In the 1st part the author reports on the varieties making the best yields for the period under review and also gives those varieties that made the best yields over periods of from 11 to 18 years. The report covers trials in St. Kitts, Nevis, and Montserrat, and includes results secured from certain new seedlings. Part II gives conclusions drawn from manurial experiments.—*J. S. Dash.*

20. Cox, J. F. **The Michigan plan for distributing improved crop varieties.** Jour. Amer. Soc. Agron. 13: 82–84. 1921.—The plan includes varietal testing, plant breeding, corn improvement, the provision of large increase fields, and the help of extension specialists and county agents. A crop improvement association and a farm bureau seed department also cooperate.—*F. M. Schertz.*

21. Cross, W. E. **The distance apart in which cane rows should be planted.** Louisiana Planter and Sugar Manufacturer 65: 233–235. *1 fig.* 1920.—The 3-year results obtained in Tucuman with cane planted in rows 0.9–2.5 m. apart agree in general with those secured at an earlier period in Louisiana, namely, the closer the rows, the greater the tonnage obtained per acre of sugar cane and sugar. Cane should be planted in rows as close together as will permit mechanical cultivation.—*C. W. Edgerton.*

22. Dawe, M. T. **Columbian Pita fibre.—Part II.** Tropic Life 17: 2–4. 1921.—The Pita fiber is of excellent quality and should sell readily for as much as henequen of Yucatan. Certain manufacturers of fiber products have offered to take the entire output of the "pitales" of Chiriguana for 3 years at the current market price of sisal. The chief drawback to the utilization of Pita fiber is the lack of machinery for efficient extraction of the fiber. It is estimated that 40 per cent of the fiber is lost by the present crude methods. A machine for extracting the fiber is being constructed in New York according to plans developed by the author. It is estimated an acre of land will support 5,000 Pita plants; each plant produces 30 leaves per year in 2 cuttings. A conservative estimate places the yield of dry fiber under improved mechanical processes of extraction at 3,030 lbs. per acre.—*H. N. Vinall.*

23. Downing, R. G. **Thick or thin seeding for wheat.** Agric. Gaz. New South Wales 32: 205. 1921.—Recommendations are made as to proper rate of seeding.—*L. R. Waldron.*

24. Grimme, C. **Über einige Hülsenfrüchte aus der Levante und aus Kamerun.** [**Leguminous plants from the Levante and Kamerun.**] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 37–41. 1920.

25. Guthrie, F. B. **Analysis of Saltbush.** Agric. Gaz. New South Wales 32: 207–210. 1921.—Ash analyses are given of *Atriplex leptocarpum* (*?*), *A. nummularia*, and *Chenopodium triangulare* as possible sources of potash. In the 2 species of *Atriplex* 40 per cent of the pure ash was composed of K_2O. Notes are given on the value of saltbushes for fodder. Analysis shows them to compare favorably with standard fodders.—*L. R. Waldron.*

26. Guthrie, F. B., G. W. Norris, and J. G. Ward. **The influence of atmospheric variations on the weight of bagged wheat.** Agric. Gaz. New South Wales 32: 200–202. 1921.—A bag of wheat was weighed daily for 2 years. Weight and absolute and relative humidity are shown graphically. Variations in weight of wheat, of lesser intensity, were found to correspond with variations in humidity. No coefficients are given and the data are not handled statistically.—*L. R. Waldron.*

27. Harland, S. C. **Manurial experiments with sea island cotton in St. Vincent in 1918-19, with some notes on the control of certain diseases by spraying.** West Indian Bull. 18: 20–33. 1920.—Author draws the following conclusions: (1) Cotton responds markedly to applications of both artificial and organic manures after it has been grown on the same land for a number of years; (2) the size of the crop, leaving pests and diseases out of account, is limited chiefly by the supply of potash in the soil; (3) most cultivated lands of the colony show the rust disease, locally known by the name of "red leaf," which is the characteristic sign of potash exhaustion; (4) phosphate is not to be recommended since the combination of this and potash gave inferior yields to potash alone; (5) cotton-seed meal alone is not to be recommended. The best practice would be to rotate sugar-cane with cotton, using cotton-seed meal and pen manure for the former, and for the latter an artificial fertilizer containing potash; (6) maturity is not affected by manurial treatment; (7) ratio of bolls to flowers is not affected by differences in manurial treatment; (8) in St. Vincent there is great uniformity in the time at which

flowering and bolling begin, reach their maximum, and conclude. The bulk of the 1st crop is picked from the 21st to 24th week from sowing; (9) cotton stainers (*Dysdercus* spp.) being now under control, losses of crop are caused mainly by shedding of buds and bolls, and external-boll and soft-rot diseases. Experiments concerning shedding are not yet concluded. Spraying is useless in the control of external boll disease, but further experiments are needed to determine its effects on the soft-rot disease.—*J. S. Dash.*

28. HEIDUSCHKA, A., UND J. DEININGER. **Beiträge zur Chemie der hochausgemahlenen Mehle und der daraus hergestellten Brote.** [Chemistry of highly mealed flour and bread.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 161–191. 1920.

29. HENDERSON, G. S. **Report of the Imperial Agriculturist.** Sci. Rept. Agric. Res. Inst. Pusa 1919–20: 10–30. *3 pl.* 1920.—The report includes details of crop rotation as practiced on the Institute farm; a summary of the results of permanent experiments; details of costs of operations with motorized agricultural implements; and breeding of cattle for milk production. The best results in cattle breeding have been obtained from crossing native Indian cows and Ayrshire bulls. One cow produced 7765 pounds of milk during a lactation period of 10 months.—*Winfield Dudgeon.*

30. JACKSON, T. P. **Report on the Agricultural Department, Antigua.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. Antigua 1918–19: 39 p. 1920.—The author reports: (1) Work in gardens and observations on plants, the latter including notes on *Artabotrys odoratissima, Myroxylon Pereiras,* and *Areca catechu;* (2) work in nurseries and distribution of plants, with notes on *Eucalyptus rostrata,* a tree whose wood bids fair to replace foreign woods for railway sleepers; (3) plot experiments at the Botanic and Experiment Stations,—sweet-potato storage and varietal experiments. In the latter experiment, A12 yielded an average of 13,700 lbs. per acre after 3-years' trial; Light Red (yam) yielded an average of 20,373 lbs. per acre. In experiments with Eddoes and Tannias, Tannia Yellow came first with an average yield of 4,280 lbs. per acre after 11 years of experiment; in the fodder experiments, Pearl Millet and Early Amber sugar corn tied for first place with yields of 24,000 lbs. per acre; (4) cotton selection; (5) fungous pests and their control, with a note on *Marasmius sacchari* attacking sugar-cane; (6) progress in the sugar, cotton, lime, coconut, onion and corn industries; and (7) miscellaneous notes on silos and ensilage, reafforestation, plant legislation, etc.—*J. S. Dash.*

31. JURITZ, CHAS. F. **A South Australian vineyard soil.** Jour. Dept. Agric. Union of South Africa 2: 137–140. 1921.—The author notes the geological origin of some typical Australian vineyard soils and gives mechanical and chemical analyses of the soil from the Angaston vineyards 40 miles northeast of Adelaide, South Australia.—*A. J. Pieters.*

32. KERLE, W. D. **Farmers' experiment plots. Winter fodder variety trials, 1919-20. Upper north coast district.** Agric. Gaz. New South Wales 32: 173–180. *5 fig.* 1921.—Trials were carried out on 9 farms in this district. Yields were excellent due to favorable seasonal conditions. A trial showed that the lighter wheat seeding with field peas gave the largest forage yield. Generally wheat and peas gave better yields than wheat alone or oats alone. Oats alone yielded better than wheat alone. Yields of green forage in excess of 15 tons per acre were recorded. Phosphatic manures increased yields in all cases.—*L. R. Waldron.*

33. LEAKE, H. MARTIN. **The Egyptian cotton problem. A report to the Egyptian government.** Agric. Jour. India 15: 485–501, 595–615. 1920, 16: 7–18. 1921.—A discussion of a plan of organization for encouraging the development of the cotton industry, and for disseminating improved and pure seed.—*J. J. Skinner.*

34. LEMMERMANN, OTTO, UND KARL ECKL. **Die Rentabilität der Anwendung der künstlichen Düngemittel bei den heutigen Preisen und ihre Bedeutung für die Volksernährung.** [The profitableness of using artificial fertilizers at present prices and its meaning for the food supply.] Mitteil. Deutsch. Landw. Ges. 36: 177–182. 1921.—A series of tables showing amounts and cost of fertilizers, yields, and values.—*A. J. Pieters.*

35. Lührig. **Ueber den Blausäuregehalt des Phaseolus lunatus. [On the hydrocyanic acid content of Phaseolus lunatus.]** Pharm. Zentralhalle 62: 95-97. 1921.—Twenty shipments of Rangoon beans were examined in which the amount of hydrocyanic acid ranged from 2.3 to 37.7 mg. in 100 g. of beans. This quantity of hydrocyanic acid is not detrimental to health, because practically all of it is lost by washing the beans, boiling in water and discarding the water.—*H. Engelhardt.*

36. Maiden, J. H. **Spread of another bad weed.** Agric. Gaz. New South Wales 32: 202. 1921.—Note is given on *Gilia squarrosa*, California stinkweed.—*L. R. Waldron.*

37. Matenaers, F. F. **O. P. V. Silage.** Mitteil. Deutsch. Landw. Ges. 36: 184. 1921.—A note on oat-pea-vetch silage said to be very satisfactory in Nova Scotia. An average of 12 tons per acre green matter may be secured, and this has a higher dry weight than maize.—*A. J. Pieters.*

38. Matenaers, F. F. **Praktische Erfahrungen mit der Sonnenblumensilage. [Practical experience with sunflower silage.]** Mitteil. Deutsch. Landw. Ges. 36: 154. 1921.—A brief account of success with this silage in Iowa is copied from the St. Paul, Minnesota, "Deutschen Farmer." The sunflowers yielded 20 tons per acre against 10 tons of maize on similar land. In spite of some decay due to imperfect ensiling, cattle ate the silage as eagerly as the maize silage; there was no apparent difference in the flow of milk.—*A. J. Pieters.*

39. Moffet, S. **Conseils practiques pour améliorer la culture de la pomme de terre. [Practical advice to improve the cultivation of potatoes.]** Bull. Sci. Pharm. 27: 638–642. 1920.—Diseases of the potato are discussed and advice is given in regard to the selection of the tubers for propagation.—*H. Engelhardt.*

40. Moore, J. C. **Report on the Agricultural Department, Grenada.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. Grenada 1918-19: 38 p. 1920.—Work of botanical interest falls under 4 heads: (1) Work in gardens and observations on plants, including a note on a guava (Indian White) yielding a fruit weighing 10 oz. and having a circumference of 10 in.; (2) plot and other experiments, with remarks on yam culture, corn storage, edible beans, and Sunn Hemp (*Crotalaria juncea*); (3) progress of industries, giving export figures, etc., of cacao, spices, cotton, and limes; (4) plant legislation.—*J. S. Dash.*

41. Moore, J. C. **Report on the Agricultural Department, Grenada. April-December 1919.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. Grenada 1919: 21 p. 1921.—Plot experiments with Sunn Hemp (*Crotalaria juncea*) and with yam varieties (*Momordica cochinchinensis*) are recorded. The latter grew better from unshelled than from shelled seed. Onions can be successfully and profitably grown under Grenada conditions; experiments gave a yield of 3.38 tons of dried onions per acre. Full account is given of the status of the cacao, spice, sugar, cotton, coconut, and lime industries.—*J. S. Dash.*

42. Neidig, Ray E., Robert S. Snyder, and C. W. Hickman. **Sunflower silage digestion experiment with cattle and sheep.** Jour. Agric. Res. 20: 881–888. 1921.—Feeding experiments and analyses of sunflower (*Helianthus*) silage indicate that it compares very favorably with maize silage. Where both maize and sunflowers can be grown, the selection of a silage crop depends upon comparative tonnage per acre and cost of production.—*D. Reddick.*

43. Pinnow, J. **Über den sauren Charakter des Mehles. [The acid character of flour.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 243–246. 1920.

44. Pitt, J. M. **Farmers' experiment plots. Maize experiments, 1919-20. Central coast district.** Agric. Gaz. New South Wales 32: 25–27. 1921.—Maize trials were conducted in cooperation with a number of farmers. With a favorable season, high yields were secured. Improved Yellow Dent, Yellow Horsetooth, Golden Nugget, Leaming, and Manning White

were the best yielders.—In green-manuring trials, corn grown on land following field peas outyielded check plat, and this in turn outyielded maize following barley and vetches. Low yield of the corn was accounted for by the very heavy crop of barley and vetches.—*L. R. Waldron.*

45. Pridham, J. T. **Trials of imported cereals.** Agric. Gaz. New South Wales **32**: 171–172. 1921.—Notes are given on varieties of oats, wheat, and barley imported from U. S. A. and Canada. Of 4 oat varieties, O. A. C. 72, Sixty Day, Banner, and Fulghum, only the Fulghum was of promise. Of the wheat varieties Red Fife, Glyndon Fife, Red Rock, Kanred, Kharkov, Fultz, Marquis, Burbank, Super, Yeoman, and Fenman, none was found to be of promise and all were distinctly inferior to Hard Federation. Barley O. A. C. 21 is evidently worthy of further trial.—*L. R. Waldron.*

46. Reynolds, Mark H., W. R. Birks, and H. Bartlett. **Farmers experiment plots. Wheat, oat and barley experiments, 1920.** Agric. Gaz. New South Wales **32**: 153–167. *1 fig.* 1921.—In the northwestern district wheat experiments were carried out cooperatively on 15 farms; 15 varieties were involved, averaging about 7 varieties to the farm. Hard Federation and Canberra yielded well; Federation was most commonly attacked by stem rust. Experiments with barley and oats were only partially successful.—In the central western district trials were conducted on 9 farms, 12 varieties being used. Previous fallowing did not affect smut and take-all. Canberra, Hard Federation, and Yandilla King yielded well. Where a comparison was possible wheat for hay was outyielded by oats. The new oats variety, Sunrise, outyielded Algerian by 10 bushels. Results of manurial experiments were inconclusive. In 2 cases out of 3 light wheat seeding gave best yields.—In the western district, trials were conducted on 13 farms, 14 varieties of wheat being used. Canberra, Federation, and Hard Federation yielded best. Guyra oats outyielded Sunrise in 2 cases out of 3. Manurial trials with superphosphate gave increased yields. Oats for hay gave yields equal to or better than those secured from wheat. Large yields of western district are ascribed to favorable weather conditions plus available plant food accumulated during the 2 dry years, 1918 and 1919.—*L. R. Waldron.*

47. Robson, W. **Report on the Agricultural Department, Montserrat.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. Montserrat **1918-19**: 52 p. 1920.—The following topics are reported on: (1) Work in the gardens and observations on plants, with notes on *Caryocar nucifera, Tecoma spectabilis, Corypha umbraculifera, Pithecolobium Unguis-cati* (generally the most satisfactory of West Indian hedgeplants, but unfortunately a host of *Cuscuta* sp.), and *Triphasia aurantiola,* which makes a very attractive and shapely hedge. (2) Recent plant importations, including notes on *Canavalia gladiata,* which has proved satisfactory as a green-manure cover crop and for planting between young lime trees, and *Saccharum ciliare* (yielding 20 tons of green matter per acre), which may be grown on waste lands and applied as a mulch for young lime trees. (3) Cotton experiments, including extensive notes on cotton breeding work and cotton manurial experiments. (4) Observations on the lime industry. Under this head are discussed the following principal environmental factors connected with the successful development of lime trees: The amount and distribution of the rainfall,—with which is associated the humidity of the atmosphere,—amount of exposure to prevailing winds, damage from scale insects, damage from root grubs, soil medium in which trees are grown, and the manurial requirements of the trees. (5) Sugarcane variety experiments. (6) Experiments with bay trees (*Pimenta acris*), giving quantities of leaves, results of distillations, etc. (7) Minor crops, including peas, beans, yams,—the latter when grown on stakes yielded 79 per cent more than when grown without stakes,—ground nuts, sweet potatoes,—the variety Red Bourbon yielding after 18 experiments an average of 13,034 lbs. per acre,—onions, papaws, *Datura metel* as a source of Scopolamine, and green manure crops. (8) Diseases, particularly a downy mildew of young lime seedlings which is easily controlled by applying Bordeaux mixture to the plants in the beds. (9) Export figures, etc., on the cotton, lime, sugar, papain, bay oil, and onion industries. (10) Plant legislation.—*J. S. Dash.*

48. Sands, W. N., et al. **Report on the Agricultural Department St. Vincent.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. St. Vincent **1918-19**: 39 p. 1920.—An account is given of manurial experiments with cotton (see Bot. Absts. 9, Entry 27) and with arrowroot. In the latter an average gain of no less than 241 per cent over non-manured plots was attained by mulching with *Gliricidia* prunings. This procedure gives better results than the use of chemical manures.—Certain hybrids of castor oil plant between a type known as *Ricinus Gibsoni* and a St. Vincent native, have given promising plants in F_2, and a very prolific type was selected for culture in F_3. Sown on April 25 on ridges 4 feet apart with 1 foot between the plants, this type flowered in 33 days from sowing. The whole was picked on November 16, at which time the plot had yielded at the rate of 1000 lbs., or nearly 22 bushels per acre.—Recently amended plant legislation provides for the proper inspection and, if necessary, disinfection or destruction of imported plants.—Figures and other details are furnished of the cotton, starch, cacao, sugar, maize, coconut, ground nut, and pea industries.—*J. S. Dash.*

49. Sayer, Wynne. **Report of the Secretary, Sugar Bureau.** Sci. Rept. Agric. Res. Inst. Pusa **1919-20**: 116–119. 1920.—An appendix to the Scientific Reports recounting the steps that led to the formation of a Sugar Bureau by the Government of India, and reporting progress in the collection of information about the sugar industry in India.—*Winfield Dudgeon.*

50. Shepherd, A. N., R. N. Makin, and J. M. Pitt. **Farmer's experiment plots. Winter fodder variety trials, 1920. Murrumbridges irrigation areas.** Agric. Gaz. New South Wales **32**: 77–85. 1921.—Trials were conducted in various districts with barley, wheat, and oats, alone and with vetches and peas. The addition of the legumes ordinarily increased the yields, and the oats seedings generally gave the highest yields.—*L. R. Waldron.*

51. Shepherd, F. R., and W. I. Howell. **Report on the Agricultural Department, St. Kitts-Nevis.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. St. Kitts-Nevis **1918-19**: 35 p. 1920.—Small plot experiments with economic crops, including corn, peanuts, cassava, hill rice, peas, sweet potatoes, yams, and onions, are recorded; also manurial experiments with cotton. For cotton, tables, and curves of flowering, shedding, and bolling are given.—Plant legislation in force in the Presidency is noted; it includes an ordinance prohibiting the exportation of nursery stock or plants to the U. S. A. without certificate from a recognized authority.—The sugar exports show a considerable decrease for the year, owing to drought, while the area in cotton, on account of prevailing high prices, has been remarkably increased. Results with truck crops in Nevis were not, on the whole, as satisfying as those obtained in St. Kitts.—*J. S. Dash.*

52. Stadler, L. J., and C. A. Helm. **Corn in Missouri, I. Corn varieties and their improvement.** Missouri Agric. Exp. Sta. Bull. 181. *51 p.* 1921.—Variety tests of corn on 9 experiment fields and several hundred cooperative variety tests on farms in Missouri, are briefly reported. The practical value of various methods of corn improvement is discussed.—*L. J. Stadler.*

53. Stening, H. C. **Gallipoli wheat under local conditions.** Agric. Gaz. New South Wales **32**: 184. 1921.—Yields are reported on this new wheat variety at Temora Experiment Farm. It ranked 4th when grown with 12 other varieties. It resists lodging and shelling.—*L. R. Waldron.*

54. Stevenson, L. **Meadows and pastures.** Agric. Jour. [British Columbia] **6**: 40, 45. 1921.—Summary of an address to British Columbia Dairymens' Convention.—*J. W. Eastham.*

55. Thatcher, L. E. **Annual white sweet clover.** Monthly Bull. Ohio Agric. Exp. Sta. **6**: 31-32. *1 fig.* 1921.—A report on the tests of this legume as made at the Ohio station. It requires from 153 to 183 days to mature seed in Ohio and about 80 days intervene between seeding and blooming period. Earlier seeding varieties must be developed for Ohio conditions. The relative importance of this legume is as yet problematical.—*R. C. Thomas.*

56. Thorne, C. E. **Thirty-eighth annual report of the Ohio Agricultural Experiment Station.** Ohio. Agric. Exp. Sta. Bull. 338. *7–31.* 1919.—In this report the director gives the work and publications of the various departments of the Station for the year 1918–19.—*R. C. Thomas.*

57. Thorne, C. E., and Cary W. Montgomery. **County experiment farms in Ohio.** Ohio Agric. Exp. Sta. Bull. 344. *223–478.* 1920.—An account is presented of the rotation and fertilizer experiments carried on at 9 sub-stations. The work reported includes: Drainage experiments at the Clermont County farm; variety tests of corn, oats, soybeans, and wheat at the Hamilton County farm; variety tests of silage corn at the Trumbull County farm; and at the Washington County farm special attention was paid to vegetable gardening, especially to utility work with cabbage, tomatoes, and sweet corn. The crops used in the various rotations were corn, oats, wheat, clover, soy beans, tobacco, potatoes, sugar beets, alfalfa.—*R. C. Thomas.*

58. Tice, C. **The potato in British Columbia.** British Columbia Dept. Agric. Bull. 86. *75 p., 78 fig.* 1921. An information bulletin for growers. It contains a chapter on diseases.—*J. W. Eastham.*

59. Tschermak, Erich. **Massnahmen zur Gewinnung grösserer Mengen von Mutterkorn. [Measures for securing larger amounts of Ergot.]** Mitteil. Deutsch. Landw. Ges. **36:** 184–185. 1921.—Owing to the high prices paid by dealers in drugs it has become profitable to save the ergot. The author points out that any condition tending to decrease or delay fertilization of the rye, increases the chances for the production of ergot, and he makes some practical suggestions to that end.—*A. J. Pieters.*

60. Venkatraman, T. S., and R. Thomas. **The care and treatment of new sugarcane importations.** Agric. Jour. India **16:** 24–31. *Pl. 2–4.* 1921.—The packing of cane pieces for shipment is described and the methods of preliminary germination and necessary precautions against ants are discussed.—*J. J. Skinner.*

61. Wimmer, G. **Über den jetzigen Stand unserer Kenntnisse und Erfahrungen in der Tabakdüngung. [Concerning the present state of our knowledge and experience in tobacco fertilizing.]** Mitteil. Deutsch. Landw. Ges. **36:** 166–167. 1921.—A general statement of current information.—*A. J. Pieters.*

62. Zade. **Das Knaulgras. [Orchard grass.]** Arbeit. Deutsch. Landw. Ges. 305. *69 p.* 1920.—Two species of *Dactylis* are recognized as occurring in middle Europe, *D. glomerata* L. and *D. Aschersoniana* Graebner; the author concerns himself with the former. Twelve varieties have been described but culture tests have shown that they are not constant. The botanical characters and morphology of the species are described, especially the inflorescence, of which several types are illustrated. Much space is devoted to a discussion of germination. Hand-gathered orchard-grass seed respond to a sudden and sharp fluctuation in temperature. This is not so much the case with seed that have been thrashed or sweated. In field practice not more than 20 per cent of the viable seed can be counted on to produce plants. Culture, feeding value, climatic adaptation, and fertilizers are discussed briefly. Seed production is treated at some length. It is said that for conditions in Germany the home-grown seed is best. In the chapter on breeding attention is called to the difficulty of obtaining a pure line, because no seed can be secured from single select plants by self-pollination. The author's method is, therefore, to start the breeding work with 2 selected plants as nearly alike morphologically and physiologically as possible.—*A. J. Pieters.*

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

Neil E. Stevens, *Editor*

(See also in this issue Entries 273, 456, 574)

63. Anonymous. **B. E. Fernow.** Forstwiss. Centralbl. 42: 375–380. 1920.—Résumé of an article by Filibert Roth in Amer. Forestry (see Bot. Absts. 6, Entry 958) outlining the part played by Fernow in the forestry movement of America.—*W. N. Sparhawk.*

64. Anonymous. **Die Wittmack-feier der D. G. G. am Donnerstag, den 25. September 1919. [The Wittmack festival of the German horticultural society, Thursday, Sept. 25, 1919.]** Gartenflora 68: 245–254. *Portrait.* 1919.—Speeches and observances in honor of the 80th anniversary of Ludwig Wittmack (born Sept. 26, 1839), with his response, giving a few items of personal history.—*M. F. Warner.*

65. Anonymous. **[John Reader Jackson, 1837-1920.]** Nature 106: 511. 1920.—Jackson published botanical articles in various journals, as well as Commercial Botany of the Nineteenth Century (1890); he also edited Barton and Castle's British Flora Medica (1877).—*O. A. Stevens.*

66. Anonymous. **Prix et subventions attribués en 1920. Académie des Sciences, Paris. [Prizes and grants awarded in 1920 by the Paris Academy of Science.]** Compt. Rend. Acad. Sci. Paris 171: 1262–1343. 1920.—A list of the awards is given and in connection with each a brief review of the scientific achievements of the recipient. The following are the botanists and the prizes which they received: August Chevalier, Fondation Tchihatchef; H. Herissey, Prix Jecker (shared with Gault); Albert Maublanc, Prix Desmazières; Lucien Hauman-Merck, Prix de Coincy; Pierre See, honorable mention; Paul Bertrand, Prix Saintour.—*C. H. Farr.*

67. Anonymous. **The organization of the Indian Botanical Society.** Jour. Indian Bot. $1^{9/10}$: [2 p.] 1920 [1921].—At the Nagpur meeting of the Indian Science Congress, January 1920, the Botany section decided to organize an Indian Botanical Society, with the encouragement of research as its primary aim. On December 14, 1920, the membership numbered 71. The officers are: Winfield Dudgeon, President; W. Burns, Vice-President; Shiv Ram Kashyap, Secretary-Treasurer; and Birbal Sahni and K. Rangachari, Councillors.—*Winfield Dudgeon.*

68. Anonymous. **Sir D. E. Hutchins.** Nature 106: 540–541. 1920.—Hutchins died in New Zealand at the age of 70. His forestry work in India, South Africa, and Australia is noted.—*O. A. Stevens.*

69. Abbay, Richard. **Our orchards; letters to the East Anglian Daily Times, 1892-1920, with notes.** *35 p.* W. H. Harrison: Ipswich [1920].—Hargrove's History of Knaresborough (1789) says the original Ribston Pippin was raised from an apple brought from France, and that trees propagated from it were then to be found in nearly every orchard in the county. It was in 1709 that Sir Henry Goodricke, then owner of Ribston Hall, was traveling in Normandy, and took home the pips of a fine apple, from one of which came the original tree. This was blown down about a hundred years ago, but a shoot from the old stump was still living, and bearing a few apples each year, as late as 1909. The Blenheim Orange originated as a seedling in the garden of a cottager named Kempster at Woodstock, about 1792, and for many years his name was locally associated with the apple.—*M. F. Warner.*

70. Beringer, G. M. **The centenary of pharmaceutical education in America.** Amer. Jour. Pharm. 93: 75–104. *Illus.* 1921.—A review of the progress of pharmaceutical education in America during the past hundred years. The organization and progress of the Philadelphia College of Pharmacy, founded on February 23, 1821, as the Philadelphia College of Apothecaries, is described, and accounts are given of a number of personages who aided in its development. The article is illustrated with portraits of some of these persons, together with photographs of different buildings occupied by the college.—*Anton Hogstad Jr.*

71. Britten, James. **Henry William Lett (1838-1920).** Jour. Botany 59: 75–76. 1921.—An account of the Irish botanist Canon Henry William Lett, born at Hillsborough in 1838, educated at Trinity College, Dublin, ordained in 1871, and after occupying various posts, rector of Aghaderg 34 years. His botanical work was mainly with mosses and hepatics. A list of his more important papers is given.—*K. M. Wiegand.*

72. Britten, James. **Thomas Walter (1740?-88) and his grass.** Jour. Botany 59: 69–74. 1921.—A summary of materials regarding Walter's life and herbarium. His Flora Caroliniana (1788) was published by the elder John Fraser, who gives the fullest account of Walter's botanical work in his Short History of Agrostis Cornucopiae (1789). This was the *Cornucopiae perennans of* Walter (now called *Agrostis perennans*), which he and Fraser attempted to exploit in Europe as a valuable agricultural grass.—*K. M. Wiegand.*

73. [Britten, James.] **William Whitwell.** Jour. Botany 59: 84–85. 1921.—A brief account of the life and writings of Whitwell (1839–1920), who though not a critical botanist, was a careful observer and collector. His herbarium has been given to the Birmingham Museum.—*K. M. Wiegand.*

74. Carrier, Lyman. **Dr. John Mitchell, naturalist, cartographer, and historian.** Ann. Rept. Amer. Hist. Assoc. 1918: 199–219. 1921.—John Mitchell (died 1768) came to Virginia about 1700 and returned to England early in 1746. He wrote Dissertatio brevis de Principiis Botanicorum et Zoologorum (1738) and Nova Plantarum Genera Virginiensium (1741), which were published in Acta Academiae Naturae Curiosorum (1748). He corresponded with Linnæus, Collinson, Bartram (whom he visited in Pennsylvania), and other naturalists of his day. He wrote several other scientific papers, but his principal works were on American affairs. He made the best map of North America of colonial times, which was used by the peace council at the close of the Revolution. With it was published anonymously The Contest in America between Great Britain and France (1757), which, with The Present State of Great Britain and North America (1767), also issued anonymously, is definitely attributed to Mitchell in American Husbandry (London, 1775). Carrier proceeds to show that John Mitchell must also have been the author of An Account of the English Discoveries and Settlements in America, in the revised edition of Harris' Collection of Voyages and Travels, vol. 2, 1748; also of A New and Complete History of the British Empire in America (1756), and, finally, of American Husbandry, "By an American," which was published after Mitchell's death in 1775.—*M. F. Warner.*

75. Christ, Hermann. **Der Briefwechsel der Basler Botaniker des 18. Jahrhunderts Achilles Mieg, Werner de La Chenal und Jacob Christoph Ramspeck mit Albrecht von Haller.** [Correspondence of the 18th century Basel botanists Mieg, La Chenal, and Ramspeck with Haller.] Verhandl. Naturf. Ges. Basel 21: 1–59. 1918.—A collection of 59 letters from Haller to Mieg, covering the period Nov., 1755, to Dec. 3, 1777, is in the library of the University of Basel, while 27 of Mieg's own letters to Haller were published by the latter in his Epistolae ab Viris eruditis (Bern, 1773–75), vol. 4–6. The letters from Haller to La Chenal have been preserved in the Schonauer family, while those of La Chenal to Haller, covering the period 1759–1772, are included in the Epistolae vol. 3–6. These two groups of correspondence are rich in botanical interest, and have been abstracted with great thoroughness, with addition of explanatory notes in regard to the plants and authorities mentioned. By way of introduction brief outlines are given of the life and principal publications of Mieg (1731–1769), La Chenal (1736–1800), and Ramspeck (born 1722). The latter was a pupil of Haller at Göttingen, but his letters between 1748 and 1756, included in the Epistolae vol. 1–4, offer only a few items of botanical importance.—*M. F. Warner.*

76. Christ, Hermann. **Zur Geschichte des alten Gartens. V.** [Contributions to the history of old-time gardens.] Basler Zeitschr. Gesch. u. Altertumsk. 17: 370–385. 1918.—Continuing a series of papers in vol. 14–16 of the same journal (1915–17), the author discusses the origin and introduction in Switzerland of certain garden plants. He takes up *Rosa centifolia* and

several bulbs and ornamentals as noted by Clusius; North American plants introduced into Europe in the 17th century as noted by Barrelier; *Vicia faba* in Switzerland and South Germany; notes on cultivated plants and their vernacular names from Zermatt; with other items supplementary to his previous papers.—*M. F. Warner.*

77. Gee, Wilson. **South Carolina botanists: biography and bibliography.** Bull. Univ. South Carolina 72. *52 p., portraits.* 1918.—John Lawson (died 1712), Mark Catesby (about 1679–1749), Alexander Garden (about 1728–1791), William Bartram (1739–1823), Thomas Walter (about 1728–about 1788), John Drayton (1766–1822), John L. E. W. Shecut (1770–1836), James Macbride (1784–1817), Stephen Elliott (1771–1830), Henry W. Ravenel (1814–1887), Lewis R. Gibbes (1810–1894), Francis Peyre Porcher (born 1825), Joseph Hinson Mellichamp (1829–1903).—*Neil E. Stevens.*

78. Hay, T. **A rare work on alpines.** Gard. Chron. **III, 68:** 285. 1920.—Practical Hints on the Culture and General Management of Alpine or Rock Plants, by James Lothian (Edinburgh, W. H. Lizars, 1845), is probably the first book on this subject published in Great Britain, and contains an extensive and interesting catalogue of 17 pages of plants suitable for rock gardens.—*M. F. Warner.*

79. H[ewitt], J. **William Tyson.** South African Jour. Nat. Hist. **2:** 288–290. *Portrait.* 1920.—Tyson died at Grahamstown, April 14, 1920, in his 71st year. He collected the flora of South Africa for nearly 45 years, his material from East Griqualand, Pondoland, and Murraysburg being specially important. The most complete set of his plants is in the Cape Government herbarium. *Tysonia,* a genus of Boraginaceae, was dedicated to him by Dr. Bolus.—*M. F. Warner.*

80. Johnson, D. S. **The Cinchona Station.** Bot. Gaz. **69:** 347–348. 1920.—This Jamaican Station will be available for American botanists this year. Located at 5000-feet elevation on the southern slope of the Blue Mountains, its dry, sunny slope offers epiphytic and xerophytic varieties, while the moist northern slope produces liverworts, mosses, and ferns.—Botanists studying lowland plants have use of Hope Gardens and the seacoast produces vegetation of ecological interest.—*E. A. Fenner.*

81. Linné, Carl von. **Caroli Linnaei Adonis stenbrohultensis, utgiven af Felix Bryk.** *12 mo, 13+[28] p.* Björck & Börjesson: Stockholm, 1920.—See Bot. Absts. 6, Entry 1464.

82. McCubbin, W. A. **Abstracts of Canadian plant disease literature.** Ann. Rept., Quebec Soc. Protection of Plants **11:** 72–83. 1919.—A list, in alphabetical order by authors, of 220 articles on plant diseases published in Canadian bulletins or periodicals up to the end of 1918. A short explanatory note of the contents is given with each entry.—*J. H. Faull.*

83. Marquart, U. **Jagdliche und forstliche Zustände in Württemberg im 18. Jahrhundert. [Forest conditions in Würtemberg in the 18th century.]** Allg. Forst- u. Jagdzeitg. **95:** 263–266. 1919.—A brief sketch of the development of game propagation and forestry in Würtemberg during the 18th century.—*Joseph S. Illick.*

84. Payne, C. H. **Old French gardening books.** Gard. Chron. **III, 63:** 215–216. 1918.—Many English books, usually known only under the name of their translators, are actually of French origin; among others the following are identified: The Grete Herball with Le Grant Herbier en Francoys (1520?); Mascall, A Booke of the Arte and Maner how to Plant and Graffe all Sortes of Trees with Brossard, L'Art et Manière de Semer Pépins et de Faire Pépinières (1552); Surflet's Maison Rustique (1600) with that of Estienne; Evelyn's The French Gardiner with Le Jardinier Francois by Nicolas de Bonnefons; The Art of Pruning Fruit Trees (1685) with L'Art de Tailler les Arbres Fruitiers (1678) by Nicolas Venette; The Theory and Practice of Gardening (1712) by John James, with Dezallier d'Argenville, La

Theorie et la Pratique du Jardinage (1709); Fleetwood's Curiosities of Nature and Art in Husbandry and Gardening (1707) with the Curiositez de la Nature et de l'Art sur la Végétation of the Abbe Vallemont (1705).—*M. F. Warner.*

85. Russell, E. J. [Prof. Italo Giglioli.] Nature **106**: 573. 1920.—Obituary of this noted teacher and investigator in agriculture who died Oct. 1, 1920.—*O. A. Stevens.*

86. Savelli, Martino. **La vendita dell' erbario di Giuseppe Raddi.** [**The sale of Raddi's herbarium.** Bull. Soc. Bot. Ital. **1918**: 3–8. 1918.—Scope and condition of the herbarium were carefully investigated by Gaetano Baroni, head gardener of the Botanical Garden at Florence, and its purchase for the University of Pisa was urgently recommended by Savi. It comprised rare plants from Brazil and Madeira, with others from Australia, Cape of Good Hope, and the East Indies, which had been obtained by exchange from Brown, Sieber, Mayen, and other correspondents. It was also rich in groups and genera on which Raddi had specialized, such as grasses and cryptogams, *Melastoma* and *Piper*. It reached Pisa about March, 1830, and was incorporated by Savi with the University herbarium. About the same time, also, Raddi's Egyptian collections were received, the botanical portion being turned over to Savi for the herbarium, while the zoological portion was divided between the museums of Pisa and Florence.—*M. F. Warner.*

87. Senn, Gustave. **Prof. Dr. Hermann Vöchting.** Verhandl. Naturf. Ges. Basel **30**: 1–9. *Portrait.* 1919.—Vöchting was born at Bromberg, Feb. 8, 1847, and trained as a gardener. Going as a young man to the botanical garden at Berlin he came under the influence of Professor Alexander Braun, which led him to study botany under Braun, Pringsheim, and Kny; he took his degree at Göttingen in 1873. The following year he became lecturer at Bonn, where he zealously carried on his investigation of morphological problems by the experimental method. As a result of the publication of his researches in Pflüger's Archiv in 1877, he was called to the chair of botany at Basel in 1878, succeeding his friend Pfeffer, who had been called to Tübingen. In 1887 he was again called to succeed Pfeffer at the University of Tübingen, where he remained until his death, Nov. 24, 1917. His botanical work is summarized, and a list of 34 publications by him is appended.—*M. F. Warner.*

88. Sprague, T. A., and James Britten. **The botany of the "Herald."** (**Bibliographical note. LXXXIII**). Jour. Botany **59**: 22–24. 1921.—The date of issue and limits of each of the 10 parts (1852–1857) has been worked out by Sprague for The Botany of the Voyage of H. M. S. 'Herald,' by Berthold Seeman. Britten has appended a list of the various botanists who assisted in the work, with their respective contributions.—*K. M. Wiegand.*

89. Vines, S. H., and Druce, G. C. **An account of the herbarium of the University of Oxford, Part II.** *p. 21–55.* Clarendon Press: Oxford, 1919.—Beside the additions to the herbarium, there is a list of collectors represented, often with dates of birth and death or other biographical information.—*Neil E. Stevens.*

90. Waters, C. E. **More about early days of the American Fern Society.** Amer. Fern Jour. **11**: 16–19. 1921.

91. Watts, Francis. **Tropical department of agriculture with special reference to the West Indies.** West Indian Bull. **18**: 101–133. 1920.—This paper, reproduced from the Journal of the Royal Society of Arts for Feb. 20 and 27, 1920, deals with the Imperial Department of Agriculture for the West Indies, and notably the evolution of the various agricultural institutions from the smaller botanical gardens, and the part the larger institutions have played in the economic development of the colonies. Through the scientific study and development of already existing industries, such as sugar, and the fostering of others, such as cotton, a condition of depression has gradually given place to prosperity. Methods of study and control of the pests and diseases attacking staple crops and the difficulties encountered are also fully dealt with.—*J. S. Dash.*

92. Wilson, James. **Improved varieties and larger crops.** Jour. Dept. Agric. Ireland **21**: 18–25. 1921.—Account of European conditions from 1653 to the present.—*Donald Folsom.*

93. W[right], C. H. **Drawings of Indian plants.** Roy. Bot. Gard. Kew. Bull. Misc. Inform. **1919**: 207–208. 1919.—Kew has a set of about 600 drawings, most of which appear to have belonged to Claude Martin (1731–1800), officer of the East India Company and later major-general in the Bengal Army. Most of the plants are named by William Roxburgh, who received material for his Flora Indica from Martin, who lived at Lucknow 1776–1800. With this collection are other drawings of plants from the Caucasus or Northern Persia, probably made for Sir Gore Ouseley when ambassador to Persia 1810–1814.—*M. F. Warner.*

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*

Alfred Gundersen, *Assistant Editor*

(See also in this issue Entries 70, 91, 132, 135, 157, 299, 335, 336, 350, 574)

94. Anonymous. [Rev. of: Babcock, E. B., and J. L. Collins. **Genetics laboratory manual.** *xi + 56 p.* McGraw-Hill Book Co.: New York; Hill Publishing Co., Ltd.: London, 1918.] Sci. Prog. [London] **14**: 171. 1919.

95. Anonymous. [Rev. of: Bower, F. O. **Botany of the living plant.** *x + 580 p., fig. 147.* Macmillan & Co.: London, 1919.] Sci. Prog. [London] **14**: 348–349. 1919.

96. Anonymous. [Rev. of: Gager, C. S. **A laboratory guide for general botany.** 2nd ed., *x + 206 p.* P. Blakiston's Son & Co.: Philadelphia, 1919.] Sci. Prog. [London] **14**: 349. 1919.

97. Anonymous. [Rev. of: Neville, H. A. D., and L. F. Newman. **A course of practical chemistry for agricultural students.** Vol. II, Part I. *122p.* Cambridge University Press: 1919.] Sci. Prog. [London] **15**: 142. 1920.

98. B., R. A. [Rev. of: Fritch, F. E., and E. J. Salisbury. **An introduction to the structure and reproduction of plants.** *8vo, viii + 458 p., 2 pl., 225 fig.* Bell & Sons: London, 1920.] Jour. Botany **59**: 82–83. 1921.

99. Barbey, A. **Le Parc National Suisse.** [The Swiss National Park.] Rev. Eaux et Forêts **58**: 353–356. 1920.—The Swiss National Park, comprising 14,000 hectares in the Engadine, was created through the efforts of the Swiss League for the Protection of Nature. Its purpose is not to serve as a mecca for tourists, but as a vast, open-air, scientific laboratory removed from the influence of man and devoted to the free development of vegetable and animal life. Hunting, grazing, and lumbering are prohibited. A Commission of Scientific Study has been established to observe and record all manifestations of nature in the park and, with the aid of a corps of Swiss naturalists, to publish monographs on its geology, fauna, flora, climatology, etc.—*S. T. Dana.*

100. Beaumont, A. B. **The introductory course in soils.** Jour. Amer. Soc. Agron. **13**: 79–81. 1921.—The paper is chiefly a discussion of the laboratory work of a course in soils.—*F. M. Schertz.*

101. Borgmann, W. **Ausbau des forstlichen Hochschulunterrichts an der Universität Giessen.** [Expansion of the forestry course at the University of Giessen.] Deutsch. Forstzeitg. **36**: 17–18. 1921.—Sometime before the war it was proposed to combine the forest schools at Giessen, Tübingen, and Karlsruhe. The question arose again after the war, and the course at Tübingen was transferred to Freiburg (Baden), but the Hessian government decided to

keep the school at Giessen and to enlarge it considerably by establishing new chairs of applied biology, including forest botany, zoology, and soil science. The school will not confine its work to forestry alone, but will cover such subjects as plants and animals injurious to fields, orchards, and vineyards.—*W. N. Sparhawk.*

102. Caldwell, Otis W., W. L. Eikenberry, and Earl R. Glenn. **Elements of general science. Laboratory problems.** *188 p.* Ginn & Co.: Boston, 1920.—Directions for 68 experiments, about one-fourth relating to plants, with questions and references.—*A. Gundersen.*

103. Caldwell, Otis W. **Contribution of biological sciences to universal secondary education.** School Sci. and Math. **21**: 103–115. 1921.

104. Call, L. E. **Prerequisites for agronomy subjects.** Jour. Amer. Soc. Agron. **13**: 49–53. 1921.—General botany and chemistry are regarded as prerequisites.—*F. M. Schertz.*

105. Dragendorff, G. **Plant analysis: Qualitative and quantitative.** *English translation from the German by Henry G. Greenish, xvi + 280 p., 11 fig.* G. E. Stechert & Co.: New York, 1921.—This is an anastatic reprint of the English edition of 1883. The work concerns the methods and results of the chemical examination of plant tissues and plant products. Part one comprises 8 chapters on examination of moisture and ash, ethereal and fixed oils, wax, chlorophyll, resins, tannins, alkaloids, glucosides, mucilage, saponin, acids, sugars, amides, inulin, proteins, starch, lignin, cellulose, and many other substances. Tables showing (1) the percentage composition of the constituents of plants mentioned in the book, and (2) the composition of the more important components of plants arranged according to percentage of carbon are given.—*C. S. Gager.*

106. Dunn, S. T. [Rev. of: Bose, G. C. **A manual of Indian botany.** *8vo, xvi + 368 p., 8 pl.* Blackie & Son: Bombay, London, and Glasgow.] Jour. Botany **59**: 83–84. 1921.

107. Miller, M. F. **The teaching of soils.** Jour. Amer. Soc. Agron. **13**: 71–78. 1921.—The paper sets forth the point of view of the members of the meeting of soil instructors held at Lexington, Kentucky. The college course in soils should carry 5 semester-hours credit and should be called "The Principles of Soil Management." Three lectures, 1 quiz and 1 laboratory period per week should be required. This course should be given in the sophomore year and the prerequisites should include inorganic chemistry, geology, and physics.—*F. M. Schertz.*

108. Schmitt, Cornel. **Botanische Schüler-Übungen nebst Resultaten. [Botanical exercises for schools, with results.]** *4th ed., 42 p.* F. P. Datterer & Co.: Freising, Germany, 1920.—Two hundred exercises with plants beginning with germination and growth.—*A. Gundersen.*

109. Shipley, A. E., et al. **Report of the Tropical Agricultural College Committee.** West Indian Bull. **18**: 1–12. 1920.—This report, made by a committee of prominent scientists appointed by the Secretary of State for the Colonies, England, covers the various points in connection with the organization of a Tropical Agricultural College in the British West Indies. Topics discussed are desirability of establishment, situation, incorporation, constitution, curriculum, sugar school, oil technology, financial arrangements, college buildings, etc.—*J. S. Dash.*

110. Sklawunos, C. G. **Die Organization des Forstpersonals in Griechenland und dessen Ausbildung. [Organization and training of the forestry personnel in Greece.]** Forstwiss. Centralbl. **42**: 443–450. 1920.—The forest administration has been handicapped since its inception (1836) by the lack of trained personnel. Forest protection has been in charge of local police officials, and local financial officers issue cutting permits and conduct sales. The foresters (Oberförster) include provincial police officers, who are now required to have a 3-months' training in forestry, and some 30 professional foresters (out of a total of 105) who

have had a short training at various Austrian schools.—The first school of forestry was established in 1896 at Vytina and serves principally for training forest guards. A school forest of 16,000 hectares (chiefly *Abies cephalonica*) serves as a field for practical training. Two other similar schools are to be established, 1 in the Aleppo pine forest Chalandrion in Attica, the other in the hardwood forest Agyia, in the Mt. Olympus region.—For training the administrative personnel, the State sends a certain number of students each year to Austria. The law of 1917 provides for a higher forest school at Athens, to give a complete 4-year course. The curriculum is described. The number of students, fixed by the Minister of Agriculture, has so far been from 15 to 25 each year.—*W. N. Sparhawk.*

111. Slate, William L., Jr. **The first college course in field crops.** Jour. Amer. Soc. Agron. **13**: 59–63. 1921.—Type, aims, content, and method of teaching the course are outlined. Its relation to the sciences, to specialized courses in crops, to farm experience and high school agriculture are shown. The author would place the course in the freshman year and allow 3–5 hours credit.—*F. M. Schertz.*

112. Stevenson, W. H., and P. E. Brown. **The teaching of soils in agricultural colleges.** Jour. Amer. Soc. Agron. **13**: 63–70. 1921.—The authors advocate uniting all branches of soil instruction in one department. A 4-year agricultural course should include 4 or 5 courses in soils, such as: Soils, soil-fertility, manures and fertilizers, soil management and soil bacteriology. The laboratory work for these courses is also outlined.—*F. M. Schertz.*

113. Wagner. **Neuordnung des forstlichen Unterrichts fur Württemberg bezw. Südwestdeutschland.** [**Suggestions for reorganization of forestry instruction in southwest Germany.**] Allg. Forst.- u. Jagdzeitg. 1919: 245–251. 1919.—Of the numerous forest schools that were established in Germany only 9 remained in 1900,—4 in North Germany and 5 in South Germany. Recently 2 more were abandoned, leaving only 7. Now Prof. Wagner, of the forestry faculty of the University of Tübingen, recommends a still further consolidation. The states of Württemberg, Hesse, and Baden, instead of having separate forest schools, which must necessarily be small in size and inadequately equipped, should bring together all their instruction in forestry in one well-equipped school, and Prof. Wagner suggests that it would be located at Heidelberg, with Tübingen as a second choice.—*Joseph S. Illick.*

114. Weatherby, C. A. **What the Latin names mean-II.** Amer. Fern Jour. **11**: 25–27. 1921.—The article completes the list of specific names started in the Amer. Fern Jour. **10**: 115–119. 1920.—*F. C. Anderson.*

115. Wentz, John B. **The standardization of courses in field crops.** Jour. Amer. Soc. Agron. **13**: 52–59. 1921.—Colleges of the U. S. A. offer 133 differently named courses in field crops; these courses when classified as to ground numbered 47 and of these 47 only 20 are offered by more than one or two colleges. A table shows that great irregularity exists in the positions of the field crop courses in the college curricula. Another table shows that great variation is found in the number of hours devoted to the different courses by different colleges. Difference in importance of some crops in different parts of the country accounts for some of the variation.—*F. M. Schertz.*

116. Wolk, P. C. van der. **De Botanische Tuin in Lissabon.** [**The Botanical Garden in Lisbon.**] Aarde en haar Volkeren **57**: 108–110. *Fig. 1–4.* 1921.

ECOLOGY AND PLANT GEOGRAPHY

H. C. Cowles, *Editor*

Geo. D. Fuller, *Assistant Editor*

(See in this issue Entries 79, 80, 127, 134, 141, 158, 196, 198, 199, 209, 345, 346, 347)

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*
J. V. Hofmann, *Assistant Editor*

(See also in this issue Entries 30, 63, 83, 101, 110, 113, 306, 439, 452, 466)

117. Anonymous. **Annual administration report of the Afforestation Division [United Provinces, India] for the financial year 1919-20.** *28 p., 3 pl.* Government Press: Allahabad, 1920.—The report covers the work of the United Provinces Forest Service in reclamation of land ruined by erosion following denudation. It is estimated that there are 8,000,000 acres of denuded or eroded waste land in the Province, of which 23,768 acres are under government control, and 4,083 acres are being actively afforested. The report considers the constitution of state forests; summary of works carried out; exploitation of areas under reclamation; history of afforestation in the United Provinces; a copy of the agreement made with owners of ravine waste land; final report on famine relief operations; and financial statements. The afforestation projects are designed to furnish reserve supplies of fodder and fuel, and to stabilize and reclaim eroding areas. Of the many trees and grasses that have been experimented with, *Acacia arabica* and *Dalbergia sissoo* are the most satisfactory trees, though *Gmelina arborea, Tectona grandis, Holoptelea integrifolia*, and certain bamboos show great promise. The cost of reclaiming and afforesting is about 60 Rs. per acre. It has been found satisfactory to use reclamation projects to provide government relief for famine sufferers as all classes of labor can be employed, and the work can be closed at any time without being left incomplete.—*Winfield Dudgeon.*

118. Anonymous. **Ce que valent chênes et frênes sur pied. [Oak and ash stumpage prices.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort **13**: 277–278. 1920.—Oak stumpage prices are now approximately 30 per cent higher than a year ago in the Vosges and Haute-Saône. The present stumpage price of oak can be determined roughly by doubling the diameter of the tree (in cm.) and subtracting 10 francs; of ash by doubling the diameter and adding 10 francs. Prices for both species are still increasing.—*S. T. Dana.*

119. Anonymous. **Congrès de 1920. [Congress of 1920.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort **13**: 212–258. 1920.—The annual meeting of the forestry society of Franche-Comté and Belfort was held at Champagney, August 9–11, 1920. In addition to the usual banquet and general assembly, field excursions were made to a number of neighboring forests. Separate abstracts are given of the speeches made and of the descriptions of the forests visited.—*S. T. Dana.*

120. Anonymous. **Entwurf eines preussischen Gesetzes über Kahlschläge in Privatwaldungen. [Proposed Prussian law regulating clear cutting in private forests.]** Deutsch. Forstzeitg. **36**: 39–41. 1921.—The proposed law forbids clear cutting of more than $\frac{1}{6}$ of the area of a forest unit, or excessive thinnings, without special permit. It applies to high forests, or similar forests, but not to coppice forests. All privately owned forests are subject to this law except those managed cooperatively, which are already provided for. This law is intended to prevent forest devastation, which is threatened, especially near the towns, until the proposed new law regarding forest culture can be passed and made effective. At present there is no legal way to prevent devastation of private forest lands in Prussia. Comments on the law, by Dr. Bertog, are appended.—*W. N. Sparhawk.*

121. Anonymous. **Errichtung von Forsteinrichtungsanstalten in Preussen. [Establishment of forest regulation office in Prussia.]** Forstwiss. Centralbl. **42**: 267–270. 1920.—The organization of a new working-plans office in the Prussian state forest service is described which will put the work of regulating the cut in the hands of specialists, and will also save the treasury considerable money.—*W. N. Sparhawk.*

122. Anonymous. **Exportation des bois de feu et du charbon de bois.** [**Exportation of firewood and charcoal.**] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort **13**: 258–260. 1920.—At its annual meeting in August, 1920, the forestry society of Franche-Comté and Belfort adopted a resolution asking the government to remove the prohibition on exports of firewood and charcoal because in eastern France available supplies were considerably in excess of local needs. The assistant secretary of agriculture replied that while it was impossible to alter present restrictions immediately because of the great need in France for fuel of all sorts, he would attempt to find a market for firewood and charcoal from this region, and that where production remained in excess of consumption he was inclined to look favorably upon permitting such exports as might appear justified.—*S. T. Dana.*

123. Anonymous. **Studies in British forestry.** Nature **106**: 646–647. 1920.—Review of bulletins 1, 2, and 3 of the Forestry Commission and comments on the work of the commission.—*O. A. Stevens.*

124. Anonymous. **Voeux votés par les conseils généraux de la Haute-Saône et du Jura tendant à l'augmentation de la production du bois d'oeuvre.** [**Increasing the production of timber.**] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort **13**: 283–288. 1920.—The general councils of the departments of the Haute Saône and the Jura have expressed their desire to support the efforts of the forest service; to secure the submission to the forest regime and the reforestation of waste areas belonging to the communes; to increase the proportion of conifers in the mountains; and to convert the stands of broadleaf coppice in the plains into high forest by increasing the number of young reserves. The conservators of waters and forests in these 2 departments have expressed their approval of this program to increase the production of timber, and have issued instructions accordingly to the forest force.—*S. T. Dana.*

125. Anonymous. [Rev. of: Boyd, J. **Afforestation.** *39 p.* W. R. Chambers, Ltd.: London, 1918.] Sci. Prog. [London] **14**: 350. 1919.

126. Anonymous. **Conifers.** [Rev. of: Coltman-Rogers, Chas. **Conifers and their characteristics.** *xiii + 333 p.* John Murray: London, 1920.] Nature **106**: 563. 1920.—Popular. Contains some errors, but is well printed and instructive. [See also Bot. Absts. 9, Entry 133.]—*O. A. Stevens.*

127. Anderlind. **Darstellung des Verhaltens der Holzarten zum Wasser.** [**Water relation of different forest trees.**] Allg. Forst- u. Jagdzeitg. **96**: 29–40. 1920.—The concluding chapter of a consideration of the water relation of specific forest trees. The species considered are green Sitka spruce, green Douglas fir, Colorado blue spruce, and white spruce. These 4 species have been introduced extensively into Europe, but Douglas fir introduction surpasses all others. The experimental plots of this species comprise 365 acres in Prussia.—*Joseph S. Illick.*

128. Arndt. **Wie kann die heimische Holzproduktion ohne Vergrösserung der Waldfläche gehoben werden?** [**How to increase wood production without increasing forest area.**] Zeitschr. Forst- u. Jagdw. **52**: 89–94. 1920.—Compulsory cooperation of small woodland owners is recommended as a means of increasing wood production without increasing the area of forest land.—*Joseph S. Illick.*

129. Beekman, H. A. J. M. **Economische gevolgtrekkingen voortr loeiende uit een analyse van den djati-opstand en van het djati-boschbedrijf op Java.** [**Economic conclusions derived from an analysis of djati growth and djati forest management in Java.**] *166 p., tables 1–4.* Wageningen, 1920.—A general account is given of the management of djati forests (*Tectona grandis*) in Java.—*J. C. Th. Uphof.*

130. Biehler. **Kann man die Kiefer natürlich verjüngen?** [**Can Scotch pine be regenerated naturally?**] Allg. Forst- u. Jagdzeitg. **96**: 2–15. 1920.—The belief prevails among

foresters that Scotch pine cannot be regenerated successfully by natural reproduction methods. Clear-cutting followed by planting is the rule. The author, by citing numerous experiments and results therefrom, makes the claim that natural regeneration of Scotch pine is not only possible, but also practicable and to be recommended from an economic standpoint. The 2 principal factors upon which the successful natural regeneration of Scotch pine depends are soil condition and stand composition.—*Joseph S. Illick.*

131. Biolley, H. **Betrachtungen über die Forsteinrichtung in der Schweiz. [Observations on forest improvement in Switzerland.]** Schweiz. Zeitschr. Forstw. 72: 40–45. *2 pl.* 1921.—An answer to Dr. Flury in issues 9 and 10 of the "Jour. Forest. Suisse." The discussion is summed up under 4 heads: 1. "The relation of forest improvement and manage ment." These can not be separated since they are interdependent. The best management is accomplished by securing the best species, which can be done only through forest improvement. In order to favor any desirable species cuttings must be on a basis to secure young growth of that species, and in this both management and improvement are involved. 2. "The determination of the current increment." The current increment during decades or periods is not a sufficient basis for methods of management unless the records are continuous. The variation of growth during various periods makes the records of little value unless they are taken continuously. Increment based on volume and age is not considered sufficient to determine growth. 3. "Heyer's Formula." The formula has a far-reaching influence since it is accepted as a basis for finances, industry, and insurance. When all stands that have not passed middle age are omitted, ½ of the forest area is not considered in summing up the increment. The formula arrives at an average over long periods but does not give current increment. 4. "The concessions of Dr. Flury." Flury admits that the current increment is necessary in selection cutting, and Biolley inquires why the same principle is not applied to all forest stands whether the young stands are in mixture or in pure stands, and the cutting regulated accordingly.—*J. V. Hofmann.*

132. Boulger, G. S. [Rev. of: Church, A. H. (1) **Elementary notes on conifers.** Bot. Mem. [Oxford] 8. *32 p.* 1920; (2) **Form-factors in Coniferae.** Ibid. 9. *28 p.* 1920.] Jour. Botany 59: 81–82. 1921.

133. Boulger, G. S. [Rev. of: Coltman-Rogers, Charles. **Conifers and their characteristics, with illustrations.** *xiii* + *333 p.* John Murray: London, 1920.] Jour. Botany 59: 27–29. 1921. [See also Bot. Absts. 9, Entry 126.]

134. Bourquet. **Les déboisements du Ballon d'Alsace. [Deforestation of the Ballon of Alsace.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 225–237. 1920.—The upper basin of the Savoreuse River reaching a maximum elevation of 1,242 m. on the Ballon of Alsace contains 1,250 hectares, of which 1,150 are covered with a mixed high forest of broad-leaf and conifer species. From 1916 to 1919 unusually heavy and intensive cuttings in these stands led to the deforestation of some 300 hectares and seriously disturbed normal forest conditions over large additional areas. These changes resulted during the winter of 1919–1920 in unprecedented floods in the Savoreuse River the total direct damages amounting to 164,000 francs as against a maximum of 4,500 in any previous year. At the request of the local residents the state is now taking steps to establish zones in which reforestation is obligatory, under the laws of April 4, 1882, and August 16, 1913, and also to purchase some 580 hectares in the 2 principal forests.—*S. T. Dana.*

135. Brunnhofer, A. von. **Verwaltungsrecht und Holzhandel—zwei Vorlesungen die an der Schweizer Techn. Hochschule gehalten werden sollten. [Administration and timber sales—two subjects that should be taught in Switzerland.]** Schweiz. Zeitschr. Forstw. 72: 65–74, 100–106. 1921.—With a minimum of 7 semesters in college and 1½ years practical experience required to pass the state examinations, the forester is not equipped to cope with the many phases of forestry and politics encountered on assuming the responsibility of a district of 4,000–13,000 hectares.—The public knows the forester only through political contact

and regards him as one who limits the activities of the people and dictates the forest policy as well as having police authority. These activities must be developed by experience and often work to the disadvantage of the inexperienced. The technical phases of forestry should also be emphasized, and the public should know that minor technical details often result in great savings to the community. With a thorough training in the handling of timber sales and the importance of technical administration, the forester is equipped to conduct the business of the forest, even in opposition of public sentiment because he knows the result will be for the common good.—In the second part special emphasis is placed on the importance of a knowledge of wood-using industries, logging, milling, and, above all, timber appraising. Uniformity in timber prices for all purposes and advertisement of prices is advocated.—*J. V. Hofmann.*

136. Cardot, E. **La question sylvo-pastorale. [Forests and grazing.]** Rev. Eaux et Forêts **58**: 323–329. 1920.—Individual trees, and still more groups of trees, are beneficial to grazing in mountainous regions because they break the force of the winds, moderate extremes of temperature, increase the relative humidity of the air and the formation of dew, decrease evaporation, and favor the propagation of the best forage plants. Trees are also necessary in such regions for the production of both timber and fuel. Difference of opinion exists as to whether trees, either singly or in groups, are more beneficial when scattered through the grazing areas or when segregated into distinct stands confined to the more exposed and least favorable sites and not open to grazing. The author adheres strongly to the latter view, and believes that the use of forests for grazing is detrimental to the best development of both trees and forage. France has so far paid too little attention to this very important problem, often with disastrous results.—*S. T. Dana.*

137. [Christy, Miller.] **"Wistman's Wood."** Jour. Botany **59**: 74–75. 1921.—This is a reprint of an article by Christy in Proc. Linn. Soc. It is an account of an ancient grove of gnarled trees of *Quercus pedunculata*, in Dartmoor. Many accounts of this wood have been written. Perhaps the earliest was that of Tristram Risdon just 3 centuries ago.—*K. M. Wiegand.*

138. Clerc, Jean. **Forêt communale de Champagney. [Communal forest of Champagney.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort **13**: 212–215. 1920.—The communal forest of Champagney has been managed consistently since 1824 as coppice under standards with a rotation of 28 years. That part of it known as Terre aux Saints is about 70 per cent oak and 30 per cent beech and other species. It was heavily overcut during the war but still has some fine reserves.—*S. T. Dana.*

139. Colley, Reginald H. **The effect of incipient decay on the mechanical properties of airplane timber.** [Abstract.] Phytopathology **11**: 45. 1921.—Tests of sound and decaying wood of Sitka spruce (*Picea sitchensis* Carr.) and Douglas fir (*Pseudotsuga mucronata* Sudw.) showed that incipient decay produced by *Fomes pinicola, F. laricis,* and *Polyporus Schweinitzii* weakened the timbers very markedly, while pieces infected with *Trametes pini* were as strong or stronger than sound wood.—*B. B. Higgins.*

140. Coventry, B. O. **Progress report of forest administration in the Jammu and Kashmir State for 1917-1918.** *77 p.* Lahore, 1920.—The usual annual report is presented. At the close of the year the total of all classes of forests was 9,495 square miles of which 8,859 were demarcated. It is stated that natural regeneration in the coniferous forests is only fairly satisfactory but varies considerably in different localities. In the Chir pine forests natural regeneration is usually very prolific provided the forests are protected from fire. Natural regeneration of deodar is good in the Lolab forest but not so satisfactory in the forests of the Kishenganga valley. On bare hill sides natural regeneration of blue pine is very conspicuous. In the broad-leaved forests natural regeneration from coppice shoots is usually satisfactory provided the areas after being felled are protected against cattle. Formal statistical statements for the year are appended.—*E. R. Hodson.*

141. Cubitt, G. E. S. **Wood in the Federated Malay States.** *81 p., 4 maps.* Government Press: Kuala Lumpur, 1920.—The forests, their distribution, and, in the view of the author, the great necessity of their conservation are discussed.—*I. H. Burkill.*

142. Demorlaine. **Forêt communale de Plancher-les-Mines.** [Communal forest of Plancher-les-Mines.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 253–255. 1920.—This forest, 37 per cent fir, 17 per cent spruce, 34 per cent beech, and 12 per cent other species, was managed until 1913 as a regular high forest with a rotation of 144 years. In 1913 steps were taken to convert it into a selection forest with the same rotation divided into 12 cycles of 12 years each. The annual yield is estimated at about 5 cubic meters per hectare. Previous cuttings of beech have been too heavy, and an effort should be made to maintain approximately the present proportion of this species.—*S. T. Dana.*

143. Demorlaine. **Forêt domaniale de Saint-Antoine.** [State forest of Saint-Antoine.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 255–258. 1920.—This, like most State forests, is at a higher elevation and further from the center of population than the adjacent communal forest. Composed of a mixed stand of broadleaf species and conifers, it is divided into 7 series with a rotation of 128 years. Five of these are treated as regular high forest, 1 as a protection forest, and 1 as an aesthetic forest. Silver fir reaches its optimum development here at an altitude of 600–1,200 m. and 1 specimen has a circumference of 4.4 m., a height of 45 m. and a volume of 30 cubic m. Rather heavy cuttings were made during the war, but these were handled so skillfully that the forest is in excellent condition.—*S. T. Dana.*

144. Diedrichs, A., und L. Knörr. **Babassonüsee und deren Öl.** [Babasso nuts and their oil.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 152–153. 1920.

145. Diedrichs, A., und L. Knörr. **Das Samenöl des Condoribaumes (Adenanthera pavonina L.).** [Seed oil of Adenanthera pavonina.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 153–155. 1920.

146. Dihm. **Ein Nachteil der Fichtenlohrindengewinnung.** [A disadvantage of spruce tanbark exploitation.] Forstwiss. Centralbl. 42: 399–401. 1920.—The shortage of tanning materials in Germany during and subsequent to the war was partly met by the use of spruce bark. Trees cut during the winter must lie in the woods until May to be peeled, but this results in very serious attacks by borers, which greatly reduce the value of the wood. It will be necessary either to give up peeling winter-felled trees, or to find means to peel them earlier so that the wood will become dry before the first beetle broods emerge in March.—*W. N. Sparhawk.*

147. Eberts. **Ergebnis der Harznutzung in einigen Staatsforsten des Regierungsbezirks Cassel im Jahr 1918.** [Turpentining in state forests of Cassel in 1918.] Allg. Forst- u. Jagdzeitg. 95: 208–212. 1919.—The result of harvesting turpentine from Scotch pine and Norway spruce is presented. The expenditures and receipts are itemized. Scotch pine stands ranging in age from 60 to 105 years produced a net yield from turpentine of 210 marks per acre, and a net profit of 1.75 marks per kg., while Norway spruce produced a net yield of only 1.40 marks per acre and 0.12 marks per kg. The net return from collecting "wild" turpentine from Norway spruce, that is, from trees barked by deer and other animals, was 0.49 mark per kg. The study showed that frequent scraping of the bleeding surface increases the total yield. The surface should be scraped and scarred at least 5 times every 2 weeks, oftener if possible.—*Joseph S. Illick.*

148. Eckstein, Karl. **Beiträge zur Kenntnis des Hausbocks, Hylotrupes bajulus L.** [Identification of wood-destroying house beetle.] Zeitschr. Forst- u. Jagdw. 52: 65–89. 1920.—A description of the life history, food habits, and damage of the wood-destroying beetle, *Hylotrupes bajulus* L. It attacks only coniferous wood and is common in building material. The larvae, which live from 3 to 11 years, perforate the wood with numerous channels and sometimes destroy it completely.—*Joseph S. Illick.*

149. Erdmann, F. **Gedanken über Waldwertrechnung. [Forest valuation.]** Zeitschr. Forst- u. Jagdw. 52: 146–166. 1920.—A critical discussion of soil value, growing stock value, sale value, expectation value, cost value, and other important subjects of forest valuation. A complete classified list of kinds of value used in forestry is given.—*Joseph S. Illick.*

150. Escherich, K. **Die Generationen des grossen braunen Rüsselkäfers (Hylobius abietis). [Generations of the large brown weevil.]** Forstwiss. Centralbl. 42: 425–431. 1920.—Investigators in different regions have disagreed as to the length of generation of the weevil, some finding a period of 15 months from egg to imago (2-year generation), others 12 months (1-year generation), and others 3–5 months (2 generations per year). All 3 positions are supported by reliable data. The difference appears to be due to climatic variations.—It is suggested that in regulated forests where the cutting is more or less concentrated in space and season the emergence of the beetles is likewise concentrated and more likely to prove harmful than where, as in a virgin stand, the beetles come out at various times through the year.—*W. N. Sparhawk.*

151. Falck. **Wege zur Kultur der Morchel-Arten. [Methods of cultivating Morels.]** Zeitschr. Forst- u. Jagdw. 52: 312–323. 1920.—A plan to raise edible fungi by natural methods within the forest as a companion crop to the wood.—*Joseph S. Illick.*

152. Fankhauser, F. von. **Aufforstung und Verbauung im Hochgebirge. [Afforestation and terracing in the high mountains.]** Schweiz. Zeitschr. Forstw. 72: 11–20. 1921.—The author takes exception to Marti's contention that the high-mountain meadows should be afforested. He states that some of the areas are above the commercial timber line and that the stocking of those areas with trees would cause an endless controversy with the grazing industry. If the mountain lakes were drained and the meadows stocked with forests the construction of numerous terraces and dams would be necessary. The cost of such construction would be prohibitive and the upkeep high. The grass lands afford sufficient protection for ordinary rainfall and the excessive rainfall is rare as are also the cloudbursts or extraordinary showers in the mountains. Consequently the protection afforded at present is as good as can be provided. The construction of terraces or dams would not provide for the exceptional and excessive rainfall, and the resultant damage and danger would be greater.—*J. V. Hofmann.*

153. Finckenstein, Finck von. **Künstliche Düngung im Walde. [Artificial fertilizing in forests.]** Zeitschr. Forst- u. Jagdw. 52: 342–345. 1920.—An experiment was started in 1913 in a 60-year old Scotch pine stand developed in an abandoned field. The area was classed as site-quality IV or V for Scotch pine. The object of the experiment was to determine the effect of artificial fertilizer. Some of the demarcated plots were treated with quicklime at the rate of 1780 lbs. per acre; others with carbonate of lime at the rate of 3660 lbs. per acre. At the end of 6 years the limed plots showed a cross-sectional growth of the stems about 6 per cent above that of the plots not limed. There was also a perceptible difference in the forest floor cover vegetation on the treated and untreated plots.—*Joseph S. Illick.*

154. Flury, Philipp. **Die Fortbildung des sächsischen Forsteinrichtungsverfahren. [The development of the methods of the forest institution of Saxony.]** Naturwiss. Zeitschr. Forst- u. Landw. 18: 249–261. 1920.—A brief, critical review of a few of the more important topics discussed in a recent publication (Tharander Forst. Jahrb. 71: 30–57, 72–89. 1920) under the above title by Dr. Martin. The author criticizes the Saxon method of regulating the yield by the use of inflexible yield tables rather than by careful measurements of the timber resources, and contends that forest management must be more or less elastic and not entirely scholastic. It must accommodate itself to all cultural changes, must protect the forest from over-utilization through calculations of the forest resources (capital) and yields based on safe and established principles, and must abandon the idea, rather firmly established in Saxony, that the "calipers" are an unnecessary implement.—*J. Roeser.*

155. Greve. **Vorschläge zur Geschäftsanweisung für preussische Staatsoberförster. [Duties of Prussian State Oberförsters.]** Zeitschr. Forst- u. Jagdw. 52: 129–140. 1920.—A comparative discussion of the duties of Prussian Oberförsters as set forth in the regulations of 1870 and what should now be regarded as their complete line of work.—*Joseph S. Illick.*

156. Gurtu, S. K. **Forests and irrigation: A plea for scientific preservation and growth of state forests and special cultures.** Agric. Jour. India 16: 32–39. 1921.

157. Guyot, Ch. **Pour la personnalité civile de l'École Nationale des Eaux et Forêts. [Making the National School of Waters and Forests a civil body.]** Rev. Eaux et Forêts 58: 351–352. 1920.—The law of August 5, 1920, made the agricultural colleges of the country civil bodies ("persons"), and provided that in all their acts as such they should be represented by a director and administered by a council. These provisions should be extended to the National School of Waters and Forests, which is now nearly 100 years old and which could make good use of the rights and privileges accorded by such a status.—*S. T. Dana.*

158. Hauber. **Der Rückgang der Vegetationsgrenzen in den Alpen und ihre Bedeutung für die Almwirtschaft. [The retreat of the vegetation limit in the Alps and its significance for the dairy industry.]** Forstwiss. Centralbl. 42: 436–443. 1920.—The retrogression of the upper limits of vegetation in the eastern Alps, and the decline or disappearance in many places of the dairy industry which formerly depended upon the high-mountain pastures, is due partly, perhaps, to climatic changes, but more to the acts of man. The cutting of alpine forests for timber, and the burning of brush-covered areas to improve pasturage, exposed the alpine meadows to the winds, with the result that grass and practically all other plant growth gradually disappeared. Overgrazing by cattle and, later, more serious overstocking with sheep, prevented reproduction of the trees, necessary to shelter the meadows, and also injured the forage cover, so that many areas which once supported abundant stock have become barren wastes. These conditions can be remedied only by establishing protective belts of brush and trees,—a long and costly task.—*W. N. Sparhawk.*

159. Heck. **Kahlschlagwirtschaft am Hochgebirge. [Clearcutting methods on mountains.]** Allg. Forst- u. Jagdzeitg. 95: 260–263. 1919.—A critical discussion of the possibilities of natural regeneration on mountain slopes. The advantages and disadvantages are discussed. Several experimental cuttings are cited.—*Joseph S. Illick.*

160. Helbig, Maximilian. **Zusammengefasste Ergebnisse der Karlsruher Stickstoffdüngungsversuche mit Fichten, ihre Bewertung und Stellung zu fremden Versuchsergebnissen. [Results of nitrogen fertilizer experiments with spruce.]** Forstwiss. Centralbl. 42: 262–267. 1920.—The results of experiments in fertilizing spruce nursery stock, 1907–1917, are summarized. Full fertilization (potash, basic slag, and nitrates) applied to 2-year transplants produced greater height growth than partial fertilization (nitrates only) or no fertilization; and the effect persisted, although to a lesser degree, with another application of the fertilizers when the trees were transplanted at 4 years of age. On the other hand, fertilized transplants, set out in the open without fertilizer when 4 years old, grew more slowly than those not fertilized in the nursery bed, and at the end of the 8th year had lost their early gains and were shorter than the partially or unfertilized ones. Relative weight of root-system was less in the completely fertilized plants, but needle weights were about the same. The foliage of fertilized plants was of a deeper green color but apparently no healthier than that of the others. Transplanting reduced the height growth of both fertilized and unfertilized plants. The conclusion is reached that fertilization of young spruce with nitrates alone is not profitable, but that complete fertilization is advantageous in cases where tall planting stock is desired at an early age.—The author's results do not entirely agree with those of Möller and Albert.—*W. N. Sparhawk.*

161. Hielscher. **Zur natürlichen Verjüngung. [Concerning natural regeneration.]** Deutsch. Forstzeitg. 36: 2–3. 1921.—Arguments for and against the use of natural reproduc-

tion are discussed with particular reference to a spruce forest in the Culm district (west Prussia).—*W. N. Sparhawk.*

162. Hilf. **Die Holzversorgung der Türkei und ihr Einfluss auf die Kriegsführung.** [Wood supply of Turkey and its influence on the world war.] Zeitschr. Forst- u. Jagdw. 52: 346–360. 1920.—A record of observations on the forest conditions of Turkey taken on the expedition of General von Falkenhayn to Palestine in 1917–18. The conclusion is reached that the failure of the expedition is to be attributed entirely to the lack of an adequate wood supply. Railroad engines had to be fired with wood. A 6-hour run required that the tender be reloaded 3 times, each tender load costing 3,000 marks. When green wood was used it was impossible to keep up enough steam to cross steep grades. The entire region covered by the expedition was poorly forested. Lemon, orange, and olive groves dotted moist and warm places, and here and there near Jewish settlements Eucalyptus plantations occurred, which were established in the belief that the trees would keep away mosquitoes. The author suggests that Turkey and adjoining countries offer a fertile field for future forestry work.—*Joseph S. Illick.*

163. Holland. **Aus der Praxis der Forsteinrichtung in Württemberg.** [Forest organization in Württemberg.] Tharander Forst. Jahrb. 72: 14–44. 1920.—A critical discussion of some of the principles of forest organization used in forest practices of Württemberg. Rotation, final and intermediate cuttings, felling budgets, compartments and subcompartments, yield, and reserve fund are among the subjects discussed. The first decade (1917–1926) of working plans for 1913–1936 are considered.—*Joseph S. Illick.*

164. Holten, Just. **Alter und Zuwachs-Untersuchungen alter Eichen in lolländischen Wäldern.** [Age and increment studies of old oaks in the forests of the island of Lolland.] Naturwiss. Zeitschr. Forst- u. Landw. 18: 261–270. *1 fig.* 1920.—A few of the giant oaks, which occur in scattered stands on the island, are described, the largest having a circumference of 900 cm. The particular type is confined to low, moist, stiff clay soils; the external features are not inherited, but are the result of favorable location and physical conditions. From a number of measurements, the author secured a diameter-increment curve from which he constructed 2 tables showing increment and age for various diameters. He also determined the basal areal increment and from it derived the rule that the basal areal increment remains constant above a diameter of approximately 100 cm., above which diameter-height growth ceases, and the size of the crown (total leaf area) remains constant. The greatest age determined (from a tree that fell in 1915) was 1059 years.—*J. Roeser.*

165. Huffel, G. **Emploi de tracteurs à chenilles dans les exploitations forestières.** [Use of caterpillar tractors in forest exploitations.] Rev. Eaux et Forêts 59: 40–42. 1921.—Experiments in the forest of Haguenau (Bas-Rhin) showed that a small, 35-horsepower caterpillar tractor weighing 660 pounds can easily climb slopes of 35–40 per cent and cross swamps, ditches, and small streams. It maneuvers readily in pole stands and does little or no damage to the soil, but is destructive to seedlings in areas under regeneration. The tractor is able to haul easily 3 pine logs with a total volume of more than 140 cubic feet, but is not recommended for extracting stumps. It fells 120-year Scotch pine at the rate of 350 cubic feet of timber and 1.5–2 cords of stump wood per hour, but is not satisfactory for felling hardwoods. It is not of interest in regions where logging is easy and not expensive, but can be used to advantage for removing logs in mountainous country without good roads or in other regions difficult of access or where team transportation is costly. Its usefulness in felling coniferous trees is limited to cases where it is desired to extract the stumps, as is usually the case, and then only when the labor of woodcutters is particularly expensive.—*S. T. Dana.*

166. Hunziker, W. **Entgipfelung judger Wiesstannen durch die Waldwühlmus (Hypodeus glareolus Wagn.)** [Topping of young white fir by the forest mouse (Hypodeus glareolus Wagn.).] Schweiz. Zeitschr. Forstw. 72: 97–100. *1 pl.* 1921.—Damage by cutting of terminal buds had been noted in various localities for several years and had been attributed to squirrels, jays, cross-bills, or deer. The typical damage (near Argau) of clean-cut tips and branches

of young growth at 0.5–6 m. above ground cast suspicion on the mouse, known to be a good climber.—Burrows and trails were common under the injured trees, but few cut tips could be found. Direct observations and trapping in the trees demonstrated the above named mouse to be the cause of the damage.—*J. V. Hofmann.*

167. Jacob, W. R. Le G. **Report on forest administration in the Andamans for 1918-19.** *45 p.* Calcutta, 1920.—The usual annual report with summarized statistical data. There is included a condensed statement covering the preceding 5-year period. In the South Division the surplus at the close of the year was 552,598 Rs., or 56.8 per cent of the revenues. This amount is offset by a deficit of 169,677 Rs. in the North Division, as the latter was organized during the year and timber extraction was not begun. A survey on 2-inch scale of the remainder of the forests of the North and Middle Andamans is required immediately, as timber utilization is about to begin. Considerable damage was done to rubber trees and seedlings in nurseries by heavy winds in June, 1918. Development of the forests, especially those of the North Andaman, necessitates a great increase in the staff, as regeneration of areas following clear cutting will require a large amount of trained supervision.—*E. R. Hodson.*

168. Jucht. **Naturverjüngung im Dürrnbucherforst. [Natural reproduction.]** Forstwiss. Centralbl. **42**: 402–404. 1920.—This pine and spruce forest (in Bavaria) had been managed on a system of clear cutting followed by artificial seeding; results were not satisfactory. In 1911 natural regeneration was decided on and secured by using a modification of Wagner's border-cutting method, and preparing the soil in advance of the preparatory cutting by removing most of the living soil cover as well as some of the dead litter in case much of the latter was present.—*W. N. Sparhawk.*

169. Junack. **Weder Bodenreinertragswirtschaft noch Waldreinertragswirtschaft. [Soil rent and forest rent.]** Zeitschr. Forst- u. Jagdw. **52**: 166–168. 1920.—A review of the forest-rent and soil-rent controversy.—*Joseph S. Illick.*

170. Katzer. **Grundlinien einer neuen Forst-Wirtschaftsphilosophie. [A new forestry point of view.]** Allg. Forst- u. Jagdzeitg. **96**: 16–17. 1920.—The author discusses some of the fundamental principles of forestry and presents a rational scheme of coordinating all branches of forestry.—*Joseph S. Illick.*

171. Kent, H. T. M. **Report on the results of mechanical tests carried out on some Malayan timbers.** *9 p.* Government Press: Kuala Lumpur, 1920.—Dry weight, elastic limit, modulus of elasticity, and modulus of rupture of the timbers of 55 species of Malayan trees.—*I. H. Burkill.*

172. Kindle, E. M. **Mackenzie River driftwood.** Geog. Rev. **11**: 50–53. 1921.—Driftwood is a familiar feature on the shores of arctic America. Dr. Fredrik Ingvarson (Die Triebhölzer auf dem Ellesmere-Land, Rept. of the second Norwegian Arctic Expedition in the Fram, 1898–1902, Vol. 3, No. 24, p. 1–57, Christiania, 1911) recognizes 3 main sources of driftwood: (1) the Yenisei and Lena rivers of Siberia, (2) the St. Lawrence, and (3) the coast of Norway. He does not mention the Mackenzie river, which Kindle considers second only to the Siberian rivers as a source of arctic coast driftwood. The Mackenzie river, although a great carrier of driftwood, is not itself a great producer. The supply comes mainly from its western tributaries, of which the Gravel and the Peele contribute large quantities; but the great bulk comes from the Liard river. In 1919 the vanguard of the main volume of the Liard driftwood reached Old Fort Good Hope on the lower Mackenzie about July 13. The writer reports that the immense volume of this floating mass of forest debris greatly exceeded anything previously seen or imagined. In general it formed a nearly continuous mass ¼ mile or more in width and in this closely packed condition occupied about 4 days in passing a given point. Spruce and poplar comprise the great bulk of the Mackenzie driftwood. "Here indeed is a mammoth supply of pulpwood delivered at tidewater, cutting and transportation free, that merits the consideration of any enterprising paper company which can

solve the commercial problem of transportation around the Alaskan coast." This vast contribution of driftwood eventually comes to rest chiefly on the coast of arctic America and the islands west of Greenland. A recent explorer reports finding fuelwood abundant 200–300 miles on either side of the Mackenzie River delta.—*E. R. Hodson.*

173. Kreutzer, E. **Reinertragslehre und Hönlingertheorie. [The theory of net rentals and Hönlinger's theory (for forest valuation).]** Oesterreich. Forst.- u. Jagd. Zeitg. **38**: 35–36. 1920.—The 2 theories are discussed and it is shown how Hönlinger attempts by mere juggling of equations to prove the correctness of his method. The author concludes that both theories are incorrect; the 1st because it does not allow for all the elements which go to make up the forest capital, and confuses costs of management and costs of maintenance in its formula; the 2nd because it is based on a false formula for soil value, due to the conception that the net yield represents rental on the soil capital only rather than on the whole forest capital.—*W. N. Sparhawk.*

174. Kunkele. **Die Umwandlung der reinen Kiefernbestände im Pfälzerwald. [Conversion of pure pine stands.]** Forstwiss. Centralbl. **42**: 281–292. 1920.—The forests of the Palatinate cover about 150,000 hectares. In the 16th century they were composed mainly of oak and beech, with small amounts of pine, fir, and other broad-leaved species; now pine occupies more than half the area. The pine is shorter than in other parts of Germany and does not grow in such dense stands; therefore, it is desirable, in order to maintain good soil conditions and to increase the yield of wood per hectare, to mix other tolerant species with the pine. The present time is particularly favorable for making this change, because the abnormal demand for timbers and fuel wood allows extensive silvicultural operations in the stands of pole size. Methods for accomplishing the desired result in various sorts of pole stands, as well as in mature stands, are described.—*W. N. Sparhawk.*

175. Langdon, Ladema M. **Identification of mahoganies.** [Rev. of: Dixon, H. H. **Mahogany, the recognition of some of the different kinds by their microscopic characteristics.** Notes Bot. School Trinity Coll. Dublin **3**: 3–58. *23 pl.* 1919 (see Bot. Absts. 3, Entry 2017).] Bot. Gaz. **69**: 189–190. 1920.

176. Leete, F. A. **Report on forest administration in Burma for year ended June 30, 1919.** 315 p. Rangoon, 1920.—An annual report with statistical data, including also a review of the preceding quinquennium. The past 5 years have witnessed a growing interest in silvicultural problems. Whereas, previously, the mixed and uneven-aged character of the forests was held to make it impossible to break away from the diffused method of working known as the "selection system," it is today generally recognized that there are immense practical possibilities in artificial regeneration, and that it need no longer be confined to small areas in a few specially favorable localities. The size of the areas clear-cut in any one place need simply to be limited by the amount of ground that can by covered with young forest growth by artificial means. This makes possible profitable use of mechanical methods of extraction of timber to a far greater extent than could have been hoped for with the old diffused method of working,—a great step forward in the development of Burma's forests. "Utilization" also is undergoing great expansion. The industrial activity in India, caused by the war, has attracted the attention of many to the commercial potentialities of Burma's forest products. The paper pulp industry is at last progressing, many tanning materials are under investigation, and wood distillation is receiving attention. Some results have been obtained in box-making, indicating successful use of plywood for the purpose. Plans are being drawn up for the organization of a Forest Research Institute for the province. A modern drying kiln has been ordered from America to aid in the solution of the numerous problems connected with seasoning. The all-important problem of the mechanical extraction of timber from the forests has recently been studied in America, where such extraction is most highly developed, by the Chief Conservator, and an American forest engineer has just arrived in Burma to assist in advising on extraction methods. Two new Conservatorships,—one for research and one for utilization,—have just been created. At the close of the year the total area of reserved

forests was 29,336 square miles, and of unclassed forests 116,829 square miles. To some extent the expansion of forest revenue will depend on the amount of revenue which the government is able to put back into the forests. But, although the percentage of surplus to gross revenue is higher in Burma than in any province in India, forest revenue cannot be devoted exclusively to expenditures on forest development since it must be prorated in accordance with the needs of all lines of the government's work. The area under approved working plans is 10,855 square miles, and 18,425 square miles are unprovided for. In the future such plans will be based on the new system of concentrated exploitation and regeneration as shown by the revised Tharrawaddy working plan. In India, extraction roads tapping previously inaccessible forests, even when constructed at high cost, have proved exceedingly profitable. During the last few years the advanced cost of elephants has made it impossible to use the animals for the extraction of timber, except teak and possibly pyinkado (*Xylia dolabriformis*). The future regeneration of the bamboo forests of Burma must be by artificial methods as natural regeneration is too uncertain and requires the retention of seed bearers. "It may be taken as an axiom that no natural product can permanently withstand a heavy artificial demand without artificial assistance to aid it in reproduction and development."—*E. R. Hodson.*

177. Ludwig. **Ein Forstdüngungsversuch in einer verheideten Fichtenpflanzung. [An experiment in forest fertilizing in a heath plantation of Norway spruce.]** Zeitschr. Forst- u. Jagdw. 52: 42–51. 1920.—An experiment established in 1914 in a 15-year-old stand of Norway spruce to determine the effect of mowing the heath plants, grubbing the surface soil, application of commercial fertilizer, inter-cropping of white alder, perennial lupine, and *Spartium scoparium*, and soil coverings with branches and broom. The experimental plot (390 × 520 feet) was located within a 30-acre plantation set out in 1903 using 4-year-old transplants spaced 4 × 4 feet. The entire plot was sub-divided into 48 quadrants (65 × 65 feet). The preliminary results show that the application of fertilizer alone neither stimulates growth nor suppresses the heath. An acceleration of growth was noted only where the physical condition of the soil was improved simultaneously with the application of the fertilizer.—*Joseph S. Illick.*

178. Marc. **La forêt domaniale d'Abrechwiller au cours du XIX^{e} siècle. [The national forest of Abrechwiller during the nineteenth century.]** Rev. Eaux et Forêts 58: 317–322, 345–350. 1920.—The forest of Abrechwiller, comprising some 3,570 hectares of nearly pure silver fir in the Basses-Vosges, was ceded to the state by the princes of Linanges in 1801 by the treaty of Lunéville. Heavily encumbered by rights of user, comparatively inaccessible, and almost without roads or other means of transportation aside from drivable streams, its management was unusually difficult. The first real working plan for the forest was prepared in 1858. Under this, rights of user were practically canceled, the reforestation of openings was secured rapidly by artificial seeding of Scotch pine and natural seeding of silver fir, and the entire stand was treated as high forest with a rotation of 120 years.—The Germans, after the annexation of Alsace-Lorraine in 1870, followed the same plan, and in addition pushed vigorously the construction of roads and trails and even of a logging railroad. In 1815, however, they made modifications which display certain features characteristic of German forest management throughout Alsace-Lorraine. These include (1) a unit of management that is administrative rather than economic, with nothing comparable to the French series; (2) a very flexible management which aims to treat each stand in accordance with its particular needs, but which tends to split the forest into an infinite number of parcels and subparcels; and (3) the absence of fixed rules of exploitation and the giving of a comparatively free rein to local forest officers.—During the past 20 years faulty reproduction cuttings and the superabundance of deer, which are very destructive of fir seedlings, have resulted in an almost complete lack of natural regeneration. To remedy this situation large areas of Norway spruce have been planted in spite of the fact that spruce is not well adapted to the site. Furthermore, complicated and confused methods, unaccompanied by any clear-cut plan of management, have led to the creation of such an infinite number of small heterogeneous parcels that the present forest resembles a "harlequin's cloak." In short, while the forest has undoubtedly increased in value during the 19th century, it has been reduced to a state of profound disorder from which it must now be rescued by the skill of the French foresters.—*S. T. Dana.*

179. Martin. **Das Streben nach Gleichheit und Ungleichheit in der Forstwirtschaft. [Striving for and against uniformity in forestry.]** Tharander Forst. Jahrb. 72: 45–61. 1920.—A comparative discussion of the methods of regeneration, both artificial and natural, used in Germany. The basic principles and objectives of many standard methods are given, and the actual results attained by each method are cited. Large unit management and small unit management, and even-aged and uneven-aged stands are compared. Some foresters favor uniformity within stands and differences between stands, while others prefer a mixed condition within stands. The author believes that there is good in both principles, that unnecessary variety should be avoided, and that undue effort should not be put forth to attain uniformity in stands.—*Joseph S. Illick.*

180. Martin. **Das Verhalten von Kiefern-Buchen-Mischbeständen in ökonomischer Hinsicht, mit besonderer Rücksicht auf die forstlichen Verhältnisse Sachsens. [Mixed stands of Scotch pine and beech in Saxony.]** Tharander Forst. Jahrb. 71: 269–282, 299–318. 1920.—Beech was originally common in the forests of Saxony. Through the use of clear-cutting methods and specializing in Norway spruce production, most of the beech has been eliminated. Recent studies show conclusively that it is desirable to bring back the beech. Mixed stands of Scotch pine and beech have advantages over pure stands of Norway spruce. They satisfy more fully the desire of forest owners, are less subject to damage by destructive agents, and keep the soil in a better productive condition.—*Joseph S. Illick.*

181. Martin. **Die Bedeutung J. H. von Thuens für die Forstwirtschaft. [Forestry work of J. H. von Thuens.]** Allg. Forst- u. Jagdzeitg. 95: 99–106, 131–137, 157–172. 1919.—A critical review of the most important research works of J. H. von Thuens, who was not a professional forester but who developed many original ideas along forestry lines and collected an enormous amount of valuable information, based chiefly upon forest experiments. Among the topics considered are land classification, wages, rate of interest, the relation of increment and growing space, and forest and stand yield. Results of sowing and planting Norway spruce are discussed and supported by several tables. The effect of different grades of thinning on Scotch pine is also discussed, and the yield of beech and oak in different site-qualities is given. A critical review of the subject of rotation and its influence upon yield is considered. The basic factors and conclusions on many important economic forest problems are reviewed in detail.—*Joseph S. Illick.*

182. Martin. **Forêt domaniale de Cherimont. [State forest of Cherimont.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 250–253. 1920.—This forest, 50 per cent beech, 20 per cent oak, 15 per cent hornbeam, and 15 per cent other species, was formerly managed as coppice under standards with a rotation of 30 years. In 1860 its conversion into high forest was decided on and a working plan prepared. The new rotation was set at 120 years with 4 periods of 30 years each and preceded by a transition period of the same length. Some underplanting of silver fir is now being done with a view to increasing the proportion of conifers.—*S. T. Dana.*

183. Martin. **Ist die Herabsetzung der Umtriebzeit und die Verminderung des Holzvorrats in den sächsischen Staatsforsten zulässig? [Is the lowering of the rotation and the corresponding reduction of growing stock in the state forests of Saxony admissible?]** Tharander Forst. Jahrb. 71: 287–297. 1920.—The percentage of forest stands over 100 years old in Germany is 15.4, in Prussia 15.4, in Bavaria 21.0, in Württemberg 11.7, and in Saxony 3.6. The present rotation in Saxony is only 85–90 years; in other states it is higher. To lower the rotation still further is not to be recommended for economic and silvicultural reasons. If the cut must be increased it may be done by making heavier thinnings and by clear-cutting undesirable stands.—*Joseph S. Illick.*

184. Meissner. **Versuche zur Hebung von Föhren und Fichtenkrüppelkulturen. [Attempts to improve stunted pine and spruce plantations.]** Forstwiss. Centralbl. 42: 315–329. 1920.—The arrested development of pine and spruce stands, common in certain parts of the

Upper Palatinate, is attributed to plant and animal enemies, principally the heather,—which temporarily suppresses the young trees,—blight, and various leaf-rollers. Various methods of improving soil conditions have been tried in order to keep down the heather and enable the trees to resist the other enemies. The best results were obtained by grubbing out the heather, or by sowing broom, larch, or possibly *Pinus strobus* among the young trees. No benefit resulted from loosening the soil by blasting, from application of various fertilizers, from intersowing of lupine, pitch pine, or jack pine, or from modifying the silvicultural system so as to give the advance reproduction a start over the heather.—*W. N. Sparhawk.*

185. Moldenhawer, K. **Enskinnet Jernbane. [Monorail.]** Dansk Skovforenings Tidsskr. 6: 19–25. *Fig. 3.* 1921.—Review of article in Dutch by Professor Te Wechel. A description of a monorail for transporting logs from the woods. It consists of 1 ordinary rail laid on posts set in the ground; a wheel running on this rail carries a balanced carrier of logs on each side of the rail line. This method is in general use in Java. Its advantages are that it is cheaply constructed, does not require wide clearings or bridges, the grade is obtained by having posts longer or shorter according to the lay of the ground, and logs are readily carried over rough ground and across creeks, roads, and natural depressions. The speed of the loads can be controlled by a brake.—*J. A. Larsen.*

186. Möller. **Kiefer-Dauerwaldwirtschaft. [A continuous method of handling Scotch pine.]** Zeitschr. Forst- u. Jagdw. 52: 4–41. 1920.—Twenty-nine years of experimenting (1884–1913) on the forest of Barenthor near Dobritz shows conclusively that an individual selection tree method or a small group selection method of natural regeneration of Scotch pine gives better results than any clear-cutting method. The new method improved the site-quality from an average of site-quality 4 to an average of site-quality 11, and brought about an increase in increment, yield, and growing stock. The author states that clear-cutting methods are unnatural and interfere with the stability of the forest organism. Individual stem and small group selection methods maintain a natural forest condition and insure the highest possible increment per cent with the highest possible and most valuable growing stock, and therefore with the best possible forest management.—*Joseph S. Illick.*

187. Müller. **Forstliche Mitteilungen aus dem preussischen Solling. [Forestry facts from Solling, Prussia.]** Zeitschr. Forst- u. Jagdw. 52: 247–262. 1920.—Chapters 6 and 7 of a continued article on forestry in Solling. Norway spruce stands are discussed. Establishment of stands by seeding have been successful and economical. Planting of seedlings costs 140 marks per hectare while successful establishment by seeding costs only 78 marks. Mound planting is recommended for clear-cut areas of hardwoods.—*Joseph S. Illick.*

188. Müller. **Gedanken über die Barenthorener Wirtschaft. [Thoughts about forest management on the Barenthor forest.]** Zeitschr. Forst- u. Jagdw. 52: 296–301. 1920.—A review of Oberforstmeister Moller's conclusion concerning the natural regeneration of Scotch pine in comparison with results of artificial regeneration.—*Joseph S. Illick.*

189. Neumeister. **Nonnengefahr für Sachsen. [Danger of Nun moth in Saxony.]** Tharander Forst. Jahrb. 72: 62–64. 1920.—The Nonne, or nun moth, did considerable damage to forest trees in Saxony in 1906 and 1912. In 1920 it appeared again in such large numbers in several forest districts bordering Bohemia that special steps must be taken to hold it in check.—*Joseph S. Illick.*

190. Parchmann, W. **Die Smaliansche Formel für Inhaltsberechnung von Stämmen und die Beurteilung derselben durch einige seiner Zeitgenossen. [Estimating tree volume by Smalian formula.]** Allg. Forst- u. Jagdzeitg. 95: 109–111. 1919.—A critical discussion of the academic and practical advantages and disadvantages of Smalian's formula for computing the volume of tree stems.—*Joseph S. Illick.*

191. Passler, Johannes. **Die Bedeutung des Eichenholzes in gerberischen Beziehung und die daraus hergestellten Eichenholzauszüge. [Oak wood and oak wood extract in the tanning industry.]** Forstwiss. Centralbl. 42: 241–249, 306–314. 1920.—Production of tannin from oak wood began about 1883 in Slavonia and Croatia, developed later in France and North America, and during the war was tried in Germany. Results of analyses are given which show that the tannin content increases with age of the tree, and is greatest in the lowest part of the bole. Sapwood contains very little tannin; the greatest amount is in the outer layers of heartwood. Young trees (under 20 years) contain too little tannin to be worked profitably. Tannin content of at least 5 per cent (air-dry weight, moisture content 14.5 per cent) is necessary for profitable operation, but the amount present varies from about 1 per cent in young sprouts, to 13 per cent, rarely exceeding 9 per cent.—The method of making the extract is described, and compositions of various extracts are given. Oak wood extract, which is different from oak bark extract, is very similar to chestnut wood extract, and gives about the same results. It is generally used in combination with chestnut, quebracho, or spruce extract.—*W. N. Sparhawk.*

192. Rattinger, K. **Die Holzvorräte der Pacifischen Nordwestküste mit besonderer Berücksichtigung von Britisch-Columbien und des südlichen Kieferngebietes der Vereinigten Staaten. [The wood resources of the Pacific Northwest.]** Forstwiss. Centralbl. 42: 293–305, 360–374. 1920.—The forest regions of Canada are described in some detail, and more particularly the Pacific Northwest. For the latter region, including both northwestern U. S. A. and British Columbia, the stands of timber, annual cut, and possible cut, are discussed. The markets for the 2 parts of the region are compared, showing that of the northwest coast woods supplied to countries bordering on the Atlantic Ocean, the United States furnishes $\frac{2}{3}$, while it supplies $\frac{3}{4}$ of the exports to countries bordering on the Pacific (excluding California). The Pacific Northwest and the southern yellow pine regions are compared with respect to amounts of standing timber, annual cut, and annual growth, and the conclusion is drawn that southern pine will soon cease to be a serious competitor of the northwestern woods.—*W. N. Sparhawk.*

193. Raux, Marcel. **Le calcul de la perte de valeur d'avenir et la question des réparations forestières. [Calculation of the loss of future value and the question of forest reparations.]** Rev. Eaux et Forêts 59: 1–10. 1921.—Official instructions for determining the reparations due from Germany as a result of forest destruction in France provide for including in the estimated damage the loss of future value in the case of trees or stands destroyed prior to the normal age of exploitation. A simple method of determining this loss without the use of compound interest formulas is as follows: Estimate the volume, and from this the value, of the tree on the basis of its diameter in 1914 and of its normal diameter at maturity (assumed to be 40 cm.). The difference between these values gives the gross loss in future value; and this gross loss divided by the ratio between the value at maturity and the value in 1914, gives the net loss. While this method avoids any determination of the 2 unknowns,—rate of interest and number of years to maturity,—in the usual compound interest formula, it gives precisely the same result, since the ratio between the value at maturity and in 1914, $\frac{V^1}{V}$, is equal to $1.0\rho n$ for the diameter selected. It is inaccurate to use a single rate of interest as applying to the yield of a tree or stand throughout its life since the rate varies greatly according to such factors as age, size, and estimated maturity. Thus by the method just described, assuming that a tree increases 5 cm. in diameter every 10 years and that its diameter at maturity is 40 cm., the future yield in the case of oak is found to vary from 66 per cent for trees 15 cm. in diameter to 3 per cent for those 35 cm. in diameter. To illustrate the importance of including the loss of future value in reparation calculations, a typical case is cited in which this value amounted to 30 per cent of the value of the high forest and to 62 per cent of the value of the young reserves.—*S. T. Dana.*

194. Rebel. **Schlagruhe und Rüsselkäfer. [Suspension of cutting and weevils.]** Forstwiss. Centralbl. 42: 335–336. 1920.—Comments on a recent article by Scheidter (see Bot. Absts. 7, Entry 146).—*W. N. Sparhawk.*

195. Reuter, M. **Die Waldweider.** [Forest grazing.] Allg. Forst- u. Jagdzeitg. 96: 40–45. 1920.—As a consequence of the feed shortage during the period of the war, as was also the case in the dry summers of 1893 and 1911, there was a marked increase in forest grazing. The author enumerates the damage to forest growth by grazing animals, and the effect of the latter upon other destructive agents. It is the author's belief that forest grazing will again be reduced to a minimum when normal economic conditions are restored.—*Joseph S. Illick.*

196. Rubner, K. **Baumkronenform und Schattenfestigkeit.** [Crown form and tolerance.] Forstwiss. Centralbl. 42: 249–258. 1920.—Mayr's law, that a given species needs less light in a warmer climate and more light in a cool climate, is not entirely true. Several trees, notably Scotch pine, spruce, larch, and oaks, increase in tolerance eastward and northward from western Germany, and are also more tolerant at the higher elevations than on the plains. There appears to be a fairly constant relationship between tolerance and form of crown, not only for the species mentioned but also for others, such as the birch, aspen, and Austrian pine. Toward East Prussia and western Russia the crowns become narrower, the trees stand closer together, their boles are more cylindrical, and height growth is more rapid. Moreover, in contrast to conditions prevailing in western Germany, natural reproduction is abundant under the shade of the old stands.—*W. N. Sparhawk.*

197. Rubner, K. **Die Krisen am Holzmarkt.** [Crises in the timber market.] Forstwiss. Centralbl. 42: 353–360, 405–415. 1920.—The author discusses the relation of the timber market to general economic conditions, and traces the fluctuations in timber imports and in timber prices in the important German states, in relation to cycles of general prosperity and depression. This relationship began with the development of a world trade in timber, in the 1860 decade. Timber has certain advantages over coal, iron, or wheat as an indicator of economic conditions, because coal and iron production and prices, being manipulated by syndicates, do not respond readily to changes in the ratio of demand to supply, while wheat production and prices depend very largely on crop conditions and to some degree upon the tariff. Timber does not have to be marketed if conditions are unfavorable except in certain cases, such as forced cuttings due to wind or other damage.—*W. N. Sparhawk.*

198. Rubner, K. [Rev. of: Björkenheim. **Beiträge zur Kenntnis einiger Waldtypen in den Fichtenwaldungen des deutschen Mittelgebirges.** [Studies of forest types in the spruce forests of central Germany.] Helsingfors, 1917.] Forstwiss. Centralbl. 42: 457–463. 1920.—Björkenheim, working along the same lines as Cajander, presents the results of studies of more than 200 spruce stands in the mountain forests of central Germany. He classifies the stands on the basis of the characteristic predominant plants in the surface vegetation (*Oxalis, Oxalis-Myrtillus, Aira, Myrtillus, Calamagrostis*). This vegetation, being a resultant of the various site factors, is a very good index of the wood-producing power of the site, as the author shows by correlating height, diameter, and basal area growth of the spruce with the sub-types described. These different sub-types call for different silvicultural treatment.—Rubner says that such conclusions are more applicable to the extensive virgin forests of Finland, northern Scandinavia, and northern Russia, than to the artificial forests of Germany where the natural vegetation has been greatly modified by neighboring cultivation of meadows and agricultural crops. Björkenheim's studies were made in the less disturbed mountain forests. Such studies of the forest vegetation are decidedly worth while because of the new points of view they afford, even though such positive results as those of Cajander and Björkenheim cannot usually be expected.—*W. N. Sparhawk.*

199. Schädelin, W. von. **Beiträge zum Kapital Spätfrost.** [Contributions to the discussion of late frosts.] Schweiz. Zeitschr. Forstw. 71: 329–344. *4 pl.* 1920.—Late frosts are common in the higher elevations of Switzerland in the region between the Jura and the Alps, and have a noticeable effect on the forests. An area of about 180 m. by 110 m. at an elevation of 559 to 581 m., was clear-cut. The natural reproduction was seriously frost injured due to the cold air drainage whereas the timber protected the young growth under it. Planted

stock of white pine was also frost injured. A small amount of larch seed was sown and a few trees survived. These are being crowded out by the hardwoods. Hardwood coppice was seriously injured by late frosts. Shoots 3 m. high and of the diameter of a cane were killed. The deepest portions of the area suffered the greatest damage. Heavy frosts occurred as late as June 6 in 1918. It is recommended that the dangerous places be planted with hardy conifers and that they be planted densely in order to provide for possible loss. Some species apparently become more frost hardy, although most of them recover rapidly if the late frosts are at intervals sufficiently long apart.—The species concerned are arranged in order of frost hardiness. The least frost resistant are the walnut, ash, beech, fir, oak, and spruce; medium resistant are the native oak, maple, hornbeam, and elm; the hardy trees are the white pine and the Scotch pine.—*J. V. Hofmann.*

200. Schaeffer. **Un essai de futaie jardinée feuille. [A trial of broadleaf selection forest.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 239–247. *1 fig.* 1920.—While coppice under standards is undoubtedly the most widely used method of treatment in France, it has long been recognized that it falls far short of producing the maximum amount of timber. The classic method of converting such stands into high forest is too slow, too complicated, and involves too great a sacrifice of present returns to be practicable. A more feasible method, which is already virtually in use in many places, is to establish by relatively frequent improvement cuttings a selection high forest in which the number of trees is inversely proportional to their diameter. This method, with cuttings about every 15 years, makes it possible to favor the most promising seedlings and saplings, to remove mature trees most advantageously, and to establish a high forest with a good yield of timber without sacrifice of present revenue. Conditions vary so widely that no set rules for applying the method can be laid down, and a thorough knowledge of silviculture is necessary to use it to advantage.—*S. T. Dana.*

201. Schüpfer. [Rev. of: Reuss, Hermann. **Der Forsthaushalt aufgelöst in seine praktischen Einzelverrichtungen auf dem Gebiet der Wirtschaft und Verwaltung.** Leipzig und Wien, 1918.] Forstwiss. Centralbl. 42: 272–273. 1920.—The particular purpose of this book is to acquaint forest owners with the general principles of forest management, and it is written in such a way as to be readily comprehended by persons who have no technical training in forestry.—*W. N. Sparhawk.*

202. Schwappach. **Der Reichsforstwirtschaftsrat und das forstliche Vereinswesen. [National forestry departments and forestry associations.]** Zeitschr. Forst- u. Jagdw. 52: 140–146. 1920.—A discussion of the scope and results of work of national departments of forestry and forestry associations, including the German forestry association and local associations.—*Joseph S. Illick.*

203. Siefert und Helbig. **Weitere Ergebnisse der Stickstoffdüngungsversuche mit 2- und 4-jährigen Fichten. [Fertilizer experiments with spruce transplants.]** Forstwiss. Centralbl. 42: 258–261. 1920.—Results of further observations (1914–1917) on the height growth of spruce transplants, some unfertilized and others treated in 1909 with various fertilizers are presented. The plants to which nitrate fertilizers had been applied showed more rapid growth during the first few years, but by 1917 had been almost overtaken by the unfertilized ones, whose actual and percentage growth was at that time considerably greater.—*W. N. Sparhawk.*

204. Stephani. **Forstliche Vereine. [Forestry associations.]** Allg. Forst- u. Jagdzeitg. 95: 205–208. 1919.—A suggestive discussion of forestry associations and societies. The need for such associations is outlined, and 3 distinct kinds of associations are recommended: (1) Associations for the promotion of forestry; (2) associations which uphold the interest of forest property owners; (3) associations of forest officers.—*Joseph S. Illick.*

205. Stolp, W. **Impregneeren van hout. [Impregnation of timber.]** De Natuur 41: 69–72. *Fig. 1–4.* 1921.—A general account is given of the impregnation of wood by various agents under normal and high pressure, as practiced in the Netherlands.—*J. C. Th. Uphof.*

206. Trebeljahr. **Kiefern-Dauerwaldwirtschaft. [Continuous method of handling Scotch pine.]** Zeitschr. Forst- u. Jagdw. 52: 289–296. 1920.—A critical discussion of the position taken by Oberforstmeister Möller in recommending the natural regeneration of Scotch pine by a method which he terms continuous forest management.—*Joseph S. Illick.*

207. Vanselow. **Von der Spessarteiche. [The Spessart oak.]** Forstwiss. Centralbl. 42: 345–353. 1920.—The Spessart oak is the most valuable product of German forestry. Its wood is in great demand for furniture and brings extremely high prices,—9560 marks per cubic meter in 1920 for 1st class material, and 6995 marks per cubic meter for all grades, as compared with 82 marks in 1901. Being grown on a rotation of from 200 to almost 500 years, the trees are exceptionally large and straight, with boles clear of branches for 20 to 25 meters and with a diameter of from 2 to 4 feet. The oak is usually started in pure stands, and underplanted with beech after it is about 100 years old. Another method is to start both oak and beech at the same time. Each method has certain advantages and disadvantages, but both have shown that beech is absolutely essential for the best development of the oak when grown on such long rotations. Silvicultural treatment of the stands is discussed in some detail.—*W. N. Sparhawk.*

208. Vater. **Der Kalkgehalt des Bodens und die Buche. [Lime content of soil and beech.]** Tharander Forst. Jahrb. 71: 319–329. 1920.—Beech requires more lime than fir, spruce, or pine. Schroder found that a pure stand of beech on an average site requires annually 41.7 kg. per acre, while fir requires only 33.5, spruce 28.4, and pine 10.6 kg. Only a portion of the lime absorbed goes into the wood; most of it goes into the leaves and with their fall and decomposition again becomes available. Of all the principal European forest trees the beech most completely checks the leaching out of the soil. It is a protector of the soil, and lime will stimulate its growth.—*Joseph S. Illick.*

209. Whitford, H. N. **The Patagonian forests.** [Rev. of: Rothkugel, Max. **Los Bosques Patagonicos.** Buenos Aires, 1916.] Geog. Rev. 11: 141. 1921.

210. Wilbrand, R. **Wald und Rente. [The forest and income.]** Allg. Forst- u. Jagdzeitg. 95: 197–200. 1919.—A discussion of the real goal of municipal forests, and a technical discussion of various forms of forest management and forest income. Financial consideration must not overshadow other important and essential factors. The city of Düsseldorf bought from the state of Prussia a tract of forest land, for which 2,000 marks per acre were paid for the soil alone and an additional amount for the growing stock. It is estimated that the best financial return that can be hoped for is about 0.75 per cent on the capital invested. The city of Giessen in Hessen bought city forest land for 1184 marks per acre, of which only 236 marks was figured for the soil value. In spite of the high price paid for the land, the purchases are justified fully by the indirect benefits, which the author believes should be given greater weight than the financial consideration. In an appended short review Dr. Wimmenauer concurs with most of the author's conclusions.—*Joseph S. Illick.*

211. Wilbrand. **Waldrechnung und Weltrechnung. [Forest finance and world finance.]** Zeitschr. Forst- u. Jagdw. 52: 337–342. 1920.—A general discussion of the influence of the rate of exchange, rise in price, and other economic factors on forest finance and general world finance. The article shows the effect of compound interest calculations in normal times and compares the period of the war and since the war with pre-war prices and conditions.—*Joseph S. Illick.*

212. Wimmer. [Rev. of: Rubner, Konrad. **Die Bewegung der Holzpreise in Deutschland vom Beginn des Weltholzhandels bis zum Welt-Krieg. (Movement of timber prices in Germany.)** Neudamm, 1920.] Forstwiss. Centralbl. 42: 453–456. 1920.—A very comprehensive and detailed study, with diagrams and tables, of timber prices in all of the German states for which such figures are available for the period 1875–1914. Economic laws governing the formation of timber prices are discussed, and the relation between such prices and the general economic situation is shown.—*W. N. Sparhawk.*

213. Witzgall, L. **Der Langenbrander Schirmkeilschlag von Forstmeister Dr. Eberhard und der Wagnersche Blendersaumschlag in Gaildorf.** [**The Langenbrand shelterwood wedge cutting and Wagner's selection strip cutting.**] Forstwiss. Centralbl. **42**: 431–436. 1920.—A discussion and comparison of these 2 silvicultural methods, both of which aim to establish the new stand by means of natural reproduction.—*W. N. Sparhawk.*

214. Zwilling, C. **La conversion des taillis sous futaie du département de la Moselle en haute futaie.** [**Conversion of coppice under standards into high forest in the department of Moselle.**] Rev. Eaux et Forêts **59**: 33–39. 1921.—In 1830 the French forest administration began the conversion into high forest of a part of the 32,600 hectares of broadleaf national forests in the department of Moselle. These had previously been managed as coppice under standards, as are most of the communal and private forests today. The rotation of the coppice was reduced from 25 or 35 to 20 years and the number of reserves was gradually increased during successive cuttings so as to form a selection high forest. The work was continued by the Germans after the annexation of Alsace-Lorraine, but in 1882, as a result of decreased prices for fuel wood, they made the mistake of undertaking the conversion of all the national forests. This resulted in failure on the thin, clayey soils not suited to the production of broadleaf high forests. Another later mistake, which was, however, soon rectified, was the application of a rigid diameter limit, sometimes with disastrous results. Aside from this the forests under conversion were in general well cared for. Thinnings as well as reproduction cuttings were used in effecting the conversion and were carried out in the lower as well as the upper story. Double high forests were often established in which the rotation of the upper story, usually oak, was twice that of the lower story, usually beech, with both of which natural regeneration was comparatively easy. The execution of the various cuttings was greatly facilitated by the fact that under the German administration the logging was done by the government, which, because of its direct interest in the results, was able to handle the work more effectively than private operators.—*S. T. Dana.*

GENETICS

George H. Shull, *Editor*
James P. Kelly, *Assistant Editor*

(See also in this issue Entries 2, 6, 7, 12, 18, 29, 30, 47, 48, 52, 62, 92, 94, 164, 286, 305, 316, 319, 331, 338, 339, 342, 382, 402, 452, 453)

215. Anonymous. [Rev. of: Babcock, E. B., and R. E. Clausen. **Genetics in relation to agriculture.** *15 × 23 cm., xx + 675 p., 4 colored pl., 239 fig.* McGraw-Hill Book Co.: New York, 1918 (see Bot. Absts. 1, Entry 210, 220, 244; 2, Entry 233; 3, Entry 446).] Sci. Prog. [London] **14**: 169–171. 1919.

216. Anonymous. **Heredity and social fitness.** [Rev. of: Key, Wilhelmine E. **Heredity and social fitness; a study of differential mating in a Pennsylvania family.** Carnegie Inst. Washington Publ. 296. *102 p., 2 folded diagrams.* 1920 (see Bot. Absts. 9, Entry 239).] Nature **106**: 360–361. 1920.

217. Arey, Leslie B. **On monozygotic human twins.** [Abstract.] Anat. Rec. **21**: 44. 1921.—Two specimens of early monozygotic human twins, each case unique of its kind, are presented. The first comprises 2 embryos, each 12.3 mm. long, contained within a single amnion and chorion; except for some shrinkage of the entire specimen, the embryos are normal. Each possesses its own umbilical cord and yolk-stalk; the latter are inserted separately on a common yolk-sac. This furnishes for the first time direct proof of the origin of human identical twins from a single ovum. The second specimen is of normal monochorionic twin embryos, each lying within its own amnion. One member of the pair (11.5 mm. in length) has a normal yolk-stalk and sac (4.5 × 6 mm.); the other individual (12 mm. long) lacks these structures completely, as gross and microscopic examination prove. Certain inferences are

suggested: (1) Human monozygotic twins do not result from the separation of blastomeres or blastomere clusters at the earliest stages of cleavage, but from a later fission of the inner cell mass. (2) Nevertheless, the human ovum appears to be rather rigid or determinate in its development; at least, in this case one embryo received all the yolk-sac formative cells. (3) The yolk-sac is not necessary for growth or differentiation; in fact the twin individual lacking a yolk-sac is slightly the larger, while the correlation of menstrual age and body size coincides with the norm. (4) The yolk-sac and stalk are not prerequisite to vasculogenesis; here was performed, as perfectly as ever may be expected, a natural experiment of ablation which demonstrates the independence of the embryo from such angioblastic ingrowths.—*Leslie B. Arey.*

218. Banta, A. M., and Mary Gover. **Analysis of the sexual modifications of an appendage in sex-intergrade Daphnia longispina.** [Abstract.] Anat. Rec. **17**: 348–349. 1920.—A detailed analysis of one of the appendages, the first leg, which is subject to wide modification in secondary sex characteristics in sex-intergrade strains of *Daphnia longispina* brings out the following facts: (1) Every detail of this appendage which is subject to sexual modification is also subject to intermediate development in sex-intergrade individuals; (2) the intermediate development of any portion of this appendage may represent any condition from a just distinguishable modification from that characteristic of the normal female to a condition approaching the normal male condition; (3) the different portions of the same individual appendage may show a range from fully female to moderately male in character, or from an intermediate condition to a fully male condition; (4) there is usually, however, a certain amount of correlation between the amount of maleness and femaleness manifest in the different portions of the same appendage, although this correlation is not sufficient to enable one to make a safe prediction from the amount of maleness manifest in one portion as to the condition of the other sexually modified portions of the same individual appendage.—*A. M. Banta and Mary Gover.*

219. Burger, O. F. **Variations in Colletotrichum gloeosporoides.** Jour. Agric. Res. **20**: 723–736. *Pl. 86.* 1921.—The fungus, *Colletotrichum gloeosporoides* Penz., as found in California, is a species composed of many strains. Forty-six isolations were studied and placed in 5 different groups based on mycelial growth and nature of spore production. Since characteristics of some cultures changed, a reclassification frequently became necessary. The various strains also differed in the modal length of the spores regardless of the group. The growth characteristics and size of spores varied with the media on which the strains were grown. In certain cultures the author considered that mutations arose.—*W. H. Burkholder.*

220. Burns, W. **Some aspects of plant genetics.** Proc. Seventh Indian Sci. Congress **1920**: 88-109. 1921.—Presidential address before the Botany Section of the Indian Science Congress at Nagpur, India, January, 1920. Also published in the Agric. Jour. India [see Bot. Absts. 7, Entry 868].—*Winfield Dudgeon.*

221. C., J. C. **Een Botanische Puzzle. [A botanical puzzle.]** De Natuur **41**: 39-40. *4 fig.* 1921.—Mr. J. K. Budde, the curator of the Botanical Garden of Utrecht, found a monstrosity in a pear. From its outward appearance, the fruit is composed of different divisions, following one another. The fruit had not developed seed.—*J. C. Th. Uphof.*

222. Czaja, A. Th. [German rev. of: Fleischer, Max. **Über die Entwicklung der Zwergmännchen aus sexuell differenzierten Sporen bei den Laubmoosen. (Development of dwarf males from sexually differentiated spores of the mosses.)** Ber. Deutsch. Bot. Ges. **38**: 84–92. *1 pl.* 1920.] Zeitschr. Bot. **13**: 250–251. 1921.

223. Dahlgren, K. V. Ossian. **Nedärvning av heterostyli. [On heredity of heterostyly.]** Svensk Bot. Tidskr. **15**: 166. 1921.—Lecture given in the botanical section of the Natural Science Society of students in Uppsala, Nov. 11, 1919. In *Fagopyrum esculentum* the brevistyled form is normally homozygous, and the longistyled one heterozygous.—*K. V. Ossian Dahlgren.*

224. Dahlgren, K. V. Ossian. **Pelargonium-chimär. [A Pelargonium chimera.]** Svensk Bot. Tidskr. **15**: 171. 1921.—Lecture given in the botanical section of the Natural Science Society of Uppsala, Sept. 28, 1920. In a *Pelargonium* chimera in the botanical garden in Uppsala a shoot was found which had the green and the chlorophyll-defective parts of tissue interchanged.—*K. V. Ossian Dahlgren.*

225. Dahlgren, K. V. Ossian. **Självsteriliteten hos Lysimachia nummularia. [On self-sterility of Lysimachia nummularia.]** Svensk. Bot. Tidskr. **15**: 164. 1921.—Lecture given in the botanical section of the Natural Science Society of students in Uppsala, April 29, 1911. Pollination between individuals from different countries caused fructification.—*K. V. Ossian Dahlgren.*

226. Daniel, Lucien. **Réactions antagonistiques et rôle du bourrelet chez les plantes greffées. [Antagonistic reactions and the rôle of the fusion layer in vegetable grafts.]** Compt. Rend. Acad. Sci. Paris **170**: 1512–1515. 1920.—Every true graft leads to the formation of a fusion layer at the union of stock and scion. This layer modifies conduction and establishes an antagonism between the parts, without which the grafts would be unable to live. As a result, the stock and scion are in different biological states. An examination of grafts has shown that there may be a passage of certain substances and a retention of others at the layer, or either a passage or retention of the same reserve product. These translocations of substances, with the resulting changes in biological states, have caused many unusual variations, particularly in the mode of development of the restorative parts. Adventitious roots or branches which develop may be of the true nature of stock or scion, or may in exceptional cases form graft hybrids. Various types of behavior of these restorative growths, both of roots and branches, are described.—*A. C. Fraser.*

227. Ernst, A. [German rev. of: Hoar, C. S. **Sterility as the result of hybridization and the condition of pollen in Rubus.** Bot. Gaz. **62**: 370–388. *3 pl.* 1916.] Zeitschr. Bot. **13**: 260. 1921.

228. Grier, N. M. **Notes on Hemerocallis, II.** Torreya **21**: 12–13. 1921.—The writer presents the results of a series of experiments made in 1917 on *Hemerocallis fulva,* to determine whether the plant sets seed. Four groups of experiments were conducted: (1) Fertilization of the flowers with their own pollen; (2) fertilization with pollen from the same clump of day-lilies; (3) fertilization with pollen from a far-removed clump; (4) fertilization with pollen from *H. flava.* The results were in all cases negative. No mature seeds were ever found.—*J. C. Nelson.*

229. Harder, R. [German rev. of: (1) Sperlich, Adolf. **Die Fähigkeit der Linienerhaltung (phyletische Potenz), ein auf die Nachkommenschaft von Saisonspflanzen mit festem Rhythmus ungleichmässig übergehender Faktor. (Capacity to maintain lines (phyletic potency), a factor distributed irregularly to the offspring of plants with fixed seasonal rhythm.)** Sitzungsber. Akad. Wiss. Wien **128**: 379. 1919.—(2) Idem. **Über den Einfluss des Quellungszeitpunktes, von Treibmitteln und des Lichtes auf die Samenkeimung von Alectorolophus hirsutus All.; Charakterisierung der Samenruhe. (On the influence of the time of application of forcing-agents and of light on the germination of seeds of Alectorolophus hirsutus. Characterization of seed rest.)** Sitzungsber. Akad. Wiss. Wien **128**: 477. 1919.] Zeitschr. Bot. **13**: 264–266. 1921.—[See also Bot. Absts. 4, Entry 3412.]

230. Hector, G. P. **Report of the Imperial Economic Botanist.** Sci. Rept. Agric. Res. Inst. Pusa **1919–20**: 46–57. 1920.—Tests of varieties of wheat developed at Pusa are continued for yield, strength of straw, and rust resistance.—Wilt in *Indigofera tinctoria* (indigo) is found to be due to poor root development brought on by water-logging. New root and nodule formation begins in April, and proceeds slowly till the monsoon begins, and is then rapid. Java indigo is being improved by mass selection, as plants under bags do not produce seeds.—*Linum usitatissimum* (flax) is self-pollinated; breeding and selection are in progress. Breeding

and selection are in progress on *Nicotiana tabacum* and *N. rustica* (tobacco), *Cicer arietinum* (gram), *Hibiscus cannabinus* (patwa), *Carthamus tinctorius* (safflower), *Dioscorea* spp. (yam.), and *Oryza sativa* (rice).—Chlorosis in *Corchorus* (jute) is believed to be hereditary; "The facts tend to show that it is possibly a case of maternal inheritance, the disease being passed on through the cytoplasm of the egg-cell." A form of chlorosis common in *Cajanus indicus* (arhar) apparently behaves similarly.—A program of work for 1920–21, and a list of publications for the year are given.—*Winfield Dudgeon.*

231. Hirsch. [German rev. of: Tschermak, A. von. **Über das verschiedene Ergebnis reziproker Kreuzung von Hühnerrassen und über dessen Bedeutung für die Vererbungslehre. (Theorie der Anlagenschwächung oder Genasthenie.)** (On the different results of reciprocal crossing of races of domestic fowl and on their significance for the theory of heredity. Theory of weakening of the genes or genasthenia.) Biol. Zentralbl. 37: 217–277. May, 1917.] Arch. Rassen- u. Gesellschaftsbiol. 13: 309–310. 1921.

232. Hofsten, Nils von. **Modern ärftlighetslära. [Modern genetics.]** Svenska sällskapets för Rashygien skriftserie III-IV. *14 × 22 cm., 60 p., 23 fig.* P. A. Norstedts & Söners förlag: Stockholm, 1920.—A popular essay on some important results.—*K. V. Ossian Dahlgren.*

233. Holmberg, Otto, R. **Anteckningar till nya skandinaviska floran. [Notes to a new Scandinavian flora.]**—Bot. Notiser 1920: 161–166. 1920.—Some *Equisetum* hybrids are critically discussed.—*K. V. Ossian Dahlgren.*

234. Johansson, K. **Was ist unter dem Namen Ulmus montana With. var. nitida Fr. zu verstehen. [What is to be understood under the name Ulmus montana With. var. nitida Fr.]** Bot. Notiser 1921: 71–73. *2 fig.* 1921.—A diagnosis and description of the bastard *Ulmus foliacea* Gilib × *glabra* are given.—*K. V. Ossian Dahlgren.*

235. Johnson, James. **Inheritance of disease resistance to Thielavia basicola.** [Abstract.] Phytopathology 11: 49. 1921.—Study of crosses between susceptible and resistant varieties have shown that inheritance of resistance, in this instance, does not follow a simple Mendelian ratio.—*B. B. Higgins.*

236. Jones, D. F. **A paraffine ruler for drawing curves.** Science 51: 245. 1920.—Points of desired curve are plotted on paper, placed over smooth board, and slender nails driven in at each point. Flexible strip of whalebone, metal, or bristol-board is bent around nails to fit curve, and held upright by other nails. This furnishes mould for paraffine cast of curve.—*Merle C. Coulter.*

237. Jones, Sarah V. H., and James E. Rouse. **The relation of age of dam to observed fecundity in domesticated animals.** Jour. Dairy Sci. 3: 260-290. *4 fig.* July, 1920.—Data are presented on beef cattle (Hereford and Aberdeen Angus) and sheep (Wisconsin Station flock) to prove that increasing the age of the dam up to a certain limit increases the occurrence of multiple births. Literature is cited to support this conclusion in other species.—The records for the Hereford and Aberdeen Angus breeds are taken from the herd books including the first 42 volumes for the Hereford and the first 26 volumes for the Aberdeen Angus. They show, aside from the major thesis, that 4.52 Hereford births per 1000 of herd-book records and 4.11 Aberdeen Angus births per 1000 of herd-book records are twins. A total of only 7 triplets and 1 quadruplet are recorded in either breed.—In sheep the multiple births per 1000 are 582.91 with 40.20 of these triplets.—*John W. Gowen.*

238. K., J. [Rev. of: Steinach, E. **Verjüngung durch experimentelle Neubelebung der alternden Pubertätsdrüse. (Rejuvenation through experimental revitalization of the senile sex glands.)** *68 p., 9 pl.* Julius Springer: Berlin, 1920.] Endocrinology 5: 238. 1921. [See also Bot. Absts. 9, Entry 258.]

239 Key, Wilhelmine E. **Heredity and social fitness; a study of differential mating in a Pennsylvania family.** Carnegie Inst. Washington Publ. 296. *102 p., 2 folded diagrams.* 1920.—Object of the investigation was twofold: "First, to determine the mode of evolution of the various lines of a great network with reference to traits which have direct bearing on social efficiency; second, to study the variation in the grade of these traits and the relation of this variation to the types of mating." The study is based on 1,822 individuals constituting 2 family networks of western Pennsylvania chiefly descended from 2 pairs of German immigrants of more than a century ago. There is given about 70 pages of detailed family history with characterizations of individuals and accompanied by 2 complete pedigree charts. Seven lines of descent or strains are made out which show diverse types of evolution, some to increased social efficiency and others to differing forms of degeneracy but each related to the type of marriage selection involved.—An attempt is made to express the distribution of certain traits in terms of Mendelian inheritance. Calculating ability is shown to behave as the expression of Mendelian dominance. "The assumption of a unit-character of varying potency, or better, of a number of determiners which behave in unit-like fashion, would appear to explain the phenomenon of inheritance for calculating ability as observed in these networks." Aggressiveness and perseverance are less satisfactorily shown to segregate in accordance with Mendel's law for presence or absence of determiners in the germ-plasm — The several lines are compared statistically with reference to: (1) Social efficiency, showing striking divergence; (2) fecundity, which shows a noticeable drop in later generations of all lines, but no more striking in the socially efficient lines than in the degenerate lines; (3) survival increases relatively in the socially efficient lines and decreases in the degenerate lines; (4) differential migration, the more efficient migrating. Comparison of environmental opportunities with inherent tendencies seems to indicate the greater potency of the latter. [See also Bot. Absts. 9, Entry 216.]—*Howard J. Banker.*

240. Kniep, H. [German rev. of: Hertwig, Oscar. **Allgemeine Biologie.** (General biology.) *5th improved and enlarged ed., 8 vo, xvi + 800 p.* Gustav Fischer: Jena, 1920.] Zeitschr. Bot. 13: 173–174. 1921.

241. Kottur, G. L. **Cross-fertilization and sterility in cotton.** Agric. Jour. India 16: 52–59. 1921.—Adaptations of cotton flower to both self- and cross-pollination are described and predominance of self-fertilization noted. Vicinism amounting to 6 per cent was observed when 2 easily distinguishable strains were grown side by side at Dharwar, India. Occurrence of several manifestations of sterility, notably empty anthers and abortive ovules, was observed in naturally pollinated stocks of Indian cottons; controlled self-fertilization during 6 generations did not increase these nor the rate of boll-shedding.—*T. H. Kearney.*

242. Kristofferson, Karl B. **Undersökning av F_1 och F_2 generationerna av en spontan bastard mellan vitkal och grönkal (mit deutschen Résumé). [Investigation of F_1 and F_2 generations of a spontaneous hybrid between white cabbage and green cabbage (with a summary in German).]** Sveriges Utsädesf. Tidskr. 1921: 31–52. *8 fig.* 1921.—The hybrid was very intermediate. The leaves of the parent plants had a green midrib, which, however, in white cabbage became light red in the autumn. F_1 has a dark red violet color. In F_2 a segregation into dark red violet, light red violet, and green nerves takes place according to the ratio 9:3:4. Many characters show a continuous segregation in F_2 with the qualities of the parents as extremes. As to other characters the segregation was transgressive. Chlorophyll varieties were observed. In spite of the fact that F_2 included nearly 14000 individuals no plants similar to the grandparents were obtained. Some F_2 plants resembled old seedsmen's varieties of cabbage.—*K. V. Ossian Dahlgren.*

243. Lécaillon, A. **Sur les changements qu'on observe dans la reproduction et le développement des Bombyx polyvoltins de Chine lors-qu'ils sont transportés et élèves en France. [On the changes observed in the reproduction and development of polyvoltine Bombyx of China when they are raised in France.]** Compt. Rend. Acad. Sci. Paris 168: 529–531. Mar., 1919.—The author observes that under the climatic conditions of France, Chinese polyvoltin silk-

worms become in course of time (30 years or so) bivoltins with a tendency to univoltinism. After bivoltinism is seemingly established certain batches of eggs showed irregularity of development producing both univoltins and bivoltins, the former being winter eggs, the latter producing a second series of eggs,—summer eggs,—namely, accidental trivoltins. The latter could be reared only by artificially raising the temperature. Hence under direct influence of climate, number of generations can be reduced or multiplied as case may be.—*Isabel McCracken.*

244. Lehmann. [German rev. of: Bateson, W., and Ida Sutton. **Double flowers and sex linkage in Begonia.** Jour. Genetics 8: 199–207. *Pl. 8.* 1919 (see Bot. Absts. 3, Entry 208).] Zeitschr. Bot. **13**: 262–263. 1921.

245. Lehmann. [German rev. of: Heribert-Nilsson, Nils. **Zuwachsgeschwindigkeit der Pollenschläuche und gestörte Mendelzahlen bei Oenothera Lamarckiana. (Rate of growth in pollen-tubes and deranged Mendelian ratios in Oenothera Lamarckiana.)** Hereditas 1: 41–67. *1 fig.* 1920 (see Bot. Absts. 6, Entry 1689; 7, Entry 1691).] Zeitschr. Bot. **13**: 99–102. 1921.

246. Lehmann, E. [German rev. of: Ishikawa, M. **Studies on the embryo sac and fertilization in Oenothera.** Ann. Bot. **32**: 279–317. 1918 (see Bot. Absts. 1, Entries 482, 979, 980).] Zeitschr. Bot. **13**: 97–99. 1921.

247. Lehmann. [German rev. of: Kanda, M. **Field and laboratory studies of Verbena.** Bot. Gaz. **69**: 54–71. *4 pl., 26 fig.* 1920.] Zeitschr. Bot. **13**: 262. 1921.

248. Lehmann. [German rev. of: Stout, A. B. **Intersexes in Plantago lanceolata.** Bot. Gaz. **68**: 109–133. *Pl. 12–13.* 1919 (see Bot. Absts. 3, Entry 1517).] Zeitschr. Bot. **13**: 261. 1921.

249. Linhart, George A. **A simplified method for the statistical interpretation of experimental data.** Proc. Nation. Acad. Sci. **6**: 682–684. 1920.—Data now in press are cited as showing that all the types of frequency curves thus far published, excepting those having a zero class, conform to the mathematical expression

$$\frac{y}{y_0} = e^{-K^2\left(\log \frac{m}{m_0}\right)^2}$$

when m denotes the numerical value of any measurement, m_o the value of the mean, e the base of natural logarithms, y any frequency, and y_o a frequency of the probability of a deviation zero. From this equation, formulae for the mean, standard deviation, etc., are derived.—*John W. Gowen.*

250. Lotka, A. J. **Evolution and irreversibility.** Sci. Prog. [London] **14**: 406–417. 1920.—Author's summary follows: "It has been pointed out by biologists that organic evolution is an irreversible process. Physicists also have spoken of the second law of thermodynamics broadly as the law of evolution. In inorganic physical systems irreversible processes are attended with a decrease in certain functions of the variables defining the state of the system. In the case of organic systems we have not, in general, any such definite criteria for irreversibility or for equilibrium. In the present contribution a broad formulation of evolution, organic or otherwise, is presented in analytical form. From this it is shown that, for certain cases, functions of the variables X and the parameters P defining the state of the system, and of the coefficients a defining its characteristic properties, can be indicated, which have the property, in the neighborhood of stable equilibrium, of diminishing in the (irreversible) process of the evolution of the system, and of assuming a minimum when stable equilibrium is established. In these cases, therefore, it is possible to define in exact terms the *direction* of evolution, whereas the descriptions ordinarily given of this direction (passage from lower to higher, from simpler to more complex forms, etc.) are vague or inaccurate."—*R. E. Clausen.*

251. Lundborg, H. **Svenska folktyper, bildgalleri ordnat efter rasbiologiska principer och med en orienterande översikt. [Swedish types, portrait gallery arranged on race-biological principles and with a short general survey.]** *23 × 51 cm., 236 p., 6 colored tables.* 1920.—On pages 5–12 Swedish folk- and race-types are treated and pages 233–235 contain a chapter on "The study of Swedish folk-types, an important part of family and native-place studies." The other pages contain a portrait gallery, generally with 4 figures on each page. The material is disposed in the following groups: (1) Lapponians, (2) Norrbotton-Finns and Finnish types among the Swedish population in Sweden and in parts of Finland with Swedish inhabitants; (3) pure northern types and Swedish mixed types in Sweden, Finland, and at Runö; (4) descendants of Walloons in Sweden; (5) Swedish Jews; (6) Gypsies; (7) vagabonds, criminals and such; (8) as an appendix photos are given of a number of foreigners who have been living in Sweden for a shorter or longer time but have been punished or expelled because of vagabondage or criminality. Some of these have left descendants in Sweden.—*K. V. Ossian Dahlgren.*

252. MacBride, E. W. **The inheritance of acquired characters.** Sci. Prog. [London] **15:** 392–405. Jan. 1921.—An argument for Lamarckian factor in evolution, based upon a variety of considerations. There is a lack of evidence to support Weismann's insistence upon separation of "germ-plasm" from "soma-plasm" in ontogeny. All nuclei produced by division of egg nucleus are potentially alike; what undergoes differentiation is not nucleus but cytoplasm.—The mutations appearing in cultures of Mendelians "practically all represent deficiencies and pathological aberrations totally unlike the marks which separate natural species from one another." Experimental studies of selection in pure lines indicate that selection alone, when the environment remains constant, is powerless to effect evolution. Inheritance of effects of use and disuse appears as the only alternative.—Arguments from palaeontology and embryology are cited in favor of Lamarckian view, an example of the second being the inheritance of curvature of abdomen of hermit-crab, even if latter is prevented from finding a spiral shell. Considerable space is devoted to Kammerer's experiments, which the author does not consider discredited by attacks of Bateson and others. Experiments of Guyer and Smith are likewise stressed, and much significance is attached to the latter's suggestion that the degenerating eyes may themselves originate anti-bodies which in turn affect the germ-cells. If this view is accepted, says MacBride, the cardinal principle of the theory of the inheritability of acquired characters is conceded.—*F. B. Sumner.*

253. Mann, Harold H. **Variation in the flower of Jasminum malabaricum Wight.** Jour. Linnean Soc. London Bot. **45:** 155–158. 1920.—Author reports observations on variability of calyx and corolla and on degree of correlation between numbers of their lobes. Corolla lobes ranged from 5 to 12 with average of 7.75 lobes and coefficient of variability of 12.2 per cent. Calyx teeth ranged from 4 to 8 with average of 5.52 lobes and coefficient of variability of 3.52 per cent. No relationship was observed between calyx-lobe number and position on branch. Different plants may show different modal values. There was only a very slight tendency for number of corolla lobes to increase as number of calyx lobes increased, and *vice versa,* since coefficient of correlation was only + .1148.—*James P. Kelly.*

254. Marshall, Lucile. **Contributions of the plant breeder to the vegetable garden.** Amer. Bot. **27:** 8–17. 1921.—A brief account of 23 vegetables responding to the methods of plant and seed breeders in their effort to improve vegetable seeds.—*S. P. Nichols.*

255. Matthaei, R. [German rev. of: Goldschmidt, Richard. **Mechanismus und Physiologie der Geschlechtsbestimmung. (The mechanism and physiology of sex determination.)** *251* p., *113 fig.* Gebrüder Borntträger: Berlin, 1920.] Zeitschr. Allg. Physiol. **19:** 52–53. 1921.

256. Matthaei, R. [German rev. of: Ružička, Vladislav. **Restitution und Vererbung. Experimenteller kritischer und synthetischer Beitrag zur Frage des Determinationsproblems. (Restitution and heredity. Experimental critical and synthetic contribution to the problem of determination.)** Vortr. u. Aufsätze über Entwicklungsmech. Org. 23. *69 p.* 1919.] Zeitschr. Allg. Physiol. **19:** 48–49. 1921.

257. Matthaei, R. [German rev. of: Steinach, E. **Verjüngung durch experimentelle Neubelebung der alternden Pubertäts-Drüse. (Rejuvenation through experimental revitalization of the senile sex glands.)** Arch. Entwicklungsmech. **46**: 557–619. *9 pl., 7 fig.* 1920.] Zeitschr. Allg. Physiol. **19**: 50–52. 1921. [See also Bot. Absts. 9, Entry 238.]

258. Matthaei, R. [German rev. of: Dürken, Bernard. **Versuche über die Erblichkeit des in farbigem Lichte erworbenen Farbenkleides der Puppen von Pieris brassicae. (Studies on the inheritance of the coloration induced in the pupae of Pieris brassicae by colored light.)** Nachrichten K. Ges. Wiss. Göttingen 1919.] Zeitschr. Allg. Physiol. **19**: 49–50. 1921.

259. Milojevic, Borivoje Dim. **Sur le protoplasma génératif chez Gregarina cuneata. [On the generative protoplasm of Gregarina cuneata.]** Compt. Rend. Soc. Biol. **84**: 99–100. 1921.—Encysted *Gregarina cuneata* normally possess 2 nuclei, the behavior of which the author follows through the sexual cycle. Karyosomes lose their staining capacity and the nuclei increase in size. Around the nuclei is formed a hyaline and a very dense area which the author interprets as generative protoplasm. Hyaline area is formed by the fusion of the walls of cytoplasmic alveoli, the latter disappearing; this begins near wall of primary nuclei and extends outward. As the above appears the nuclei disintegrate and, in connection with the karyosome, the primary generative nucleus appears. This nucleus leaves the karyosome (the remains) and passes into the hyaline area. It is only there that it divides and gives rise by way of mitosis to all the other generative nuclei, the future nuclei of the gametes. This hyaline area, crammed with little vesicular nuclei, becomes peripheral in the cyst. The author thinks cytoplasm plays rôle in heredity because differentiated at the same time as generative nucleus.—*C. L. Parmenter.*

260. Mosséri, V. M. **Note sur la purification et l'amélioration des cotons égyptiens. [Purification and improvement of Egyptian cottons.]** Bull. Agric. Algérie-Tunisie-Maroc Ser. II, **27**: 6–10. 1921.—Causes of deterioration of Egyptian cotton are discussed and a plan outlined for improvement by selection.—*T. H. Kearney.*

261. Nilsson-Ehle, H. **Multiple allelomorphe und Komplexmutationen beim Weizen. (Untersuchungen über Speltoidmutationen beim Weizen II.) [Multiple allelomorphism and complex mutations in wheat (studies on speltoid mutations in wheat II).** Hereditas **1**: 277–311. 1920.—Several multiple allelomorphs in wheat are discussed. (a) Glume characters,—pubescent, half-pubescent, and glabrous. Pubescence is dominant over half-pubescence and glabrousness, and half-pubescence over glabrousness, with F_2 segregating 3:1 in each case. (b) Spike characters,—beardless, half-bearded, and bearded. The last 2 types originated from the 1st through complex mutation and linkage. Beardlessness is dominant over the other 2, and half-bearded over bearded; segregation, 3:1 in F_2. (c) Speltoid mutations,—normal type, beardless speltoid, and bearded speltoid. This multiple allelomorphism is brought about by complex mutation, i.e., a simultaneous mutative change in several Mendelian genes, being true mutations in fact. The bearded speltoid arises through complex mutation from the normal type, but the genes in question are closely linked, and therefore the possible recombinations,—the bearded normal and beardless speltoid,—seldom appear in the progeny of heterozygotes. A dense eared sub-*compactum* type arises in such progeny somewhat more frequently. *Compactum* factor is interpreted as less closely linked to other mutated factors. At least 3 genes are assumed to mutate at the same time. The author adds a theoretical discussion of nature of complex mutations and their relationships to pleiotropy, dominant and recessive characters, presence and absence theory, and evolution.—*C. E. Leighty.*

262. Nutting, C. C. **The relation of Mendelism and the mutation theory to natural selection.** Science **53**: 129–131. 1921.—The author aims to show that modern studies of genetics have left the natural selection theory practically as it was left by Darwin. His contentions may be summarized in 2 of his sentences: "Just as Mendelism has to do with the *mechanism* and not the *fact* of heredity, so the mutation theory deals with the *nature* and not the *fact* of variations. Neither, in my opinion, has any implication that is antagonistic to the theory of natural selection."—*F. B. Sumner.*

263. Oppenheim, J. D. **De erfelijkheid van het vrueg of laat bloeien bij erwten.** [Inheritance of early and late flowering in peas. Mededeel. Ver. Bevord. Wetenschap. Teelt 10. *5 p.* 1921.—The node at which individuals of a certain pure line start flowering is strikingly constant, though often fluctuating within 3 nodes. Other pure lines produce their first flower always at a certain node. Early-flowering varieties, such as Extra Early Pilot-pea, start at the 8th node, Sutton's Emerald Gem at 9th to 10th, Senator 10th to 11th. The later-flowering varieties such as Pois Ture, begin at the 17th to 19th and the Blue-flowering pea at the 18th to 19th node.—In crosses, the F_2 splits to early and late, the late being dominant in F_1. —*J. C. Th. Uphof.*

264. Papanicolaou, George N. **Developmental competition in its relationship to the sex ratio.** [Abstract.] Anat. Rec. **21**: 76. 1921.—The average sex ratio in a stock of 3472 guinea-pigs is 106.54 when the individuals born in all litters are considered. On comparing the ratios from different-sized litters great discrepancies are found. In litters of 1 the sex ratio is 112.58; in litters of 2, 112.07; in litters of 3, 97.95; in litters of 4, 108.73; and in litters of 5, 141.02. These variations may be explained on the following principles derived from a careful analysis of the developmental conditions in guinea-pigs: 1. There is a competition between developing germ-cells and embryos in the ovary and the uterus. 2. In the competition males have some advantage over the females. 3. Competition is higher in the larger litters (by a litter is meant the number of co-developing germ-cells and embryos). 4. In litters consisting of embryos of the same sex competition is higher than in mixed litters. 5. The competition is stronger among females than among males.—In agreement with these statements there is a higher percentage of complete elimination of large litters consisting chiefly of females than of any other large litters. This elimination produces the high sex ratio for the litters of 4 and 5. The originally large litters in which the subsequent elimination is partial result in births of 1 and 2. Elimination being more severe on the female members causes the production of a higher sex ratio than occurs among individuals produced in litters of 3. Litters of 3 have the lowest sex ratio and approach nearest an expected condition, having suffered little or no prenatal mortality. This explanation is supported by a study of more than 100 litters with early partial absorptions which gave the high sex ratio of 123.37.—*George N. Papanicolaou.*

265. Pearson, Karl. **On the probable errors of frequency constants.** Biometrika **13**: 113–132. 1920.—This editorial treats of the probable errors of constants supposed to be determined by a knowledge of the ranges in which certain proportions of the frequency lie. Formulae are derived for the standard deviations and correlations of the errors in any lengths measured along the x-axis as determined by the frequency of the corresponding ranges. Correlations of errors are calculated for various combinations of median, quartile, and decile when determined from grades and from moments. These are compared to show the relative errors of each method. The best method to determine the median and quartile divisions from ranks is indicated. Similar formulae are presented for the cases where the data are grouped into broad categories.—*John W. Gowen.*

266. Pearson, Karl. **The fundamental problem of practical statistics.** Biometrika **13**: 1–16. *2 diagrams.* 1920.—The fundamental problem of statistics is, "An 'event' has occurred p times out of $p + q = n$ trials, where we have no *a priori* knowledge of the frequency of the event in the total population of occurrences. What is the probability of its occurring r times in a further $r + s = m$ trials."—Prefacing his remarks with the interesting historical background, the author shows that it is sufficient to assume any continuous distribution in order to reach Bayes's theorem, the fundamental basis of statistics.—He then proceeds to expand and develop Bayes's theorem showing that the Gaussian is applicable only under the special condition that n, p, q, and m are large. Under other conditions the skew frequency curves of types I or III give better results. Attention is called to the problem: Can the incomplete β function be expressed even approximately in terms of a limited number of incomplete Γ functions?—*John W. Gowen.*

267. Pézard, Albert. **Facteur modificateur de la croissance normale et la loi de compensation. [The modifying factor of the law of normal increase and the law of compensation.]** Compt. Rend. Acad. Sci. Paris 169: 997–1000. 1919.—Pullets were found by Houssay and the author to experience an interruption in growth some weeks prior to commencement of laying, the growth curve dipping downward, but subsequently rising to same level as if no such interruption had occurred. Author found, in 3 individuals tested, that growth was uninterrupted if ovariectomy was performed some time before the depression of the growth curve would normally have occurred.—*F. B. Sumner.*

268. Plate, L. [German rev. of: Adametz, L. **Studien über die Mendelsche Vererbung der wichtigsten Rassenmerkmale der Karakulschafe bei Reinzucht und Kreuzung mit Rambouillets. (Studies on the Mendelian characters of the Karakul sheep in pure breeding and in crosses with Rambouillets.)** *258 p., 16 pl.* Borntraeger: Berlin, 1917.] Arch. Rassen- u. Gesellschaftsbiol. 13: 306–309. 1921.

269. Ragionieri, A. **Brassica crosses.** Gard. Chron. 68: 60. 1920.—Author describes hybrids resulting from crosses between Chinese cabbage, Pe-tsai, and other Brassicas. The work was done at Castello, Italy. It is pointed out that Pe-tsai has good qualities which the plant breeder should not overlook. It grows rapidly, produces many tender leaves in large firm heads, and is of good flavor. In a number of the crosses of this with other Brassicas, no fertile seed resulted. Where good seeds were obtained, the F_1 plants showed great vigor. F_1 plants from crosses with the white turnip (*B. rapa*) were vigorous and without sign of a bulb. The tendencies to produce a bulb and an entire leaf were both recessive, and both characters appeared in F_2 in the Mendelian ratio. The bulbs in the 2nd generation showed a great variety of shapes. It was demonstrated that there is a great sexual affinity between *B. rapa* and *B. chinensis* var. Pe-tsai, and a very weak one between the latter and *B. oleracea.*—*A. C. Fraser.*

270. Rasmuson, Hans. **Die Hauptergebnisse von einigen genetischen Versuchen mit verschiedenen Formen von Tropaeolum, Clarkia und Impatiens. [The chief results of some genetical studies with different forms of Tropaeolum, Clarkia, and Impatiens.]** Hereditas 1: 270–276. 1920.—A preliminary paper without data. Dark green color of leaves in *Tropaeolum majus* is determined by 2 factors. If either is recessive, color is probably green. Green color is dominant to yellow-green and both to variegated. Variegation in flowers is dominant to self color and dark color to light. Investigations were made of the behavior of purple, dark yellow, light yellow, and yellow variegated color in *Tropaeolum*; purple, purplish-red, lachs-red, and white color in *Clarkia elegans*; purple, purplish-red, white, and purple with white edge in *Clarkia pulchella*; blue, blue-red, red, pink, white, and white variegated in *Impatiens balsamina.* In *Tropaeolum* sharp monohybrid segregation was found between *nana* and normal types, but in *Impatiens* F_2 generation shows intermediate forms.—*M. Demerec.*

271. Renner, O. [German rev. of: (1) Forsaith, C. C. **Pollen sterility in relation to the geographical distribution of some Onagraceae.** Bot. Gaz. 62: 466–487. 1916; and (2) Cole, R. D. **Imperfection of pollen and mutability in the genus Rosa.** Bot. Gaz. 63: 110–123. 1917.] Zeitschr. Bot. 13: 96–97. 1921.

272. Strampelli, N. **Genealogia del frumento Carlotta Strampelli. [Genealogy of the grain Carlotta Strampelli.]** Atti R. Accad. Lincei. Roma Rend. Cl. Sci. Fis. Mat. e Nat. 27: 131–135. *Fig. 1–4.* 1918.—"Carlotta Strampelli" wheat was originated by the author by selection from the progeny of a hybrid made in 1904 or 1905 between Rieti and Massy. The work was done in connection with extensive experiments made to produce high-yielding varieties adapted to climate and soil of central and northern Italy, resistant to rust, and with tall straw yet not liable to lodge. This selection, fulfilling the requirements, was named in 1914 and exhibited in Rome. Grown 4 years since then in various provinces of northern Italy it averaged about 5.5 quintals per hectare (8¼ bushels per acre) more than other varieties.—At least 100,000 hectares were sown in 1918. Further increase in acreage sown to the variety is anticipated.—*C. E. Leighty.*

273. Thiem. [German rev. of: Haeckel, Ernst, Hugo Eisig, und Karl Heschеler. **Aus dem Leben und Wirken von Arnold Lang. (From the life and activities of Arnold Lang.)** G. Fischer: Jena, 1916.] Arch. Rassen- u. Gesellschaftsbiol. **13**: 311. 1921.

274. Thomson, J. Arthur. [French rev. of: Doncaster, L. **An introduction to the study of cytology.** *15 × 23 cm., xiv + 280 p., 24 pl., 31 fig.* Cambridge Univ. Press: England, 1920.] Scientia **29**: 233–234. 1921. [See also Bot. Absts. 7, Entries 722, 723, 842.]

275. Thomson, J. Arthur. [French rev. of: Morgan, T. H. **The physical basis of heredity.** *14 × 21 cm., 300 p., 117 fig.* J. B. Lippincott Co.: Philadelphia, 1919 (see Bot. Absts. 5, Entry 422; 7, Entry 938).] Scientia **29**: 235–236. 1921.

276. Vieillard, P. **Note sur la sélection des riz par la constitution de lignées pures et sur les hybridations des riz. [Note on the selection of rice by the constitution of pure lines and on the hybridization of rice.]** Bull. Agric. Inst. Sci. Saigon **2**: 11–15. 1920.—The methods of rice breeding in use at Tjikeumeuh near Buitenzorg (Java) are outlined. There are the usual pure line and hybridization methods commonly employed by those engaged in work on the self-fertilized cereals. The best of the pure lines have been increased and tested on a large scale, showing increased yield and other desirable characters. Selections from hybrids between "Skriviman Kati" and "Carolina" combine the good characters of the parents.—*C. E. Leighty.*

277. Vigiani, D. **Sulla selezione del frumento "Gentil Rosso." [Upon the selection of the wheat "Gentil Rosso."** Staz. Sperim. Agrarie Ital. **52**: 5–13. 1919.—Report on breeding work done at Vegni Institute (Italy) on the wheat "Gentil Rosso," which is one of the important varieties in Tuscany and other parts of northern Italy. It has been determined by tests that this variety as commonly cultivated is less rust resistant and more liable to lodge, especially on rich land, than certain other varieties, but is productive, well developed, and early-maturing. Mass selection by the author resulted in increasing the yields over the variety as ordinarily grown. By means of pure-line breeding a strain has been developed which is considered superior to Gentil Rosso; it possesses all the good characters of the latter and none of its defects.—*C. E. Leighty.*

278. Vrijburg, B. **Fokkerij in Indië op meer wetenschappelijke basis. [Breeding in India on a more scientific basis.]** Mededeel. Ver. Bevord. Wetenschap. Teelt 12. *12 p., 2 pl.* 1921.—A general outline of breeding animals in Dutch East India is given.—*J. C. Th. Uphof.*

279. Waldron, L. R. **Inheritance of rust resistance in a family derived from a cross between durum and common wheat.** North Dakota Agric. Exp. Sta. Bull. 147. *24 p., 2 fig.* 1921.—From cross between Kubanka, an amber durum, and Power Fife, a hard red spring wheat of common type, certain plants of common type showed evidence of heterozygous condition relative to resistance toward stem rust (*Puccinia graminis*). Resistance (or susceptibility) was found to be intermediate and evidently due to more than 1 factor. Theoretical ratios based on 2-factor hypothesis agreed fairly well with actual results. Degree of resistance in certain segregates was as much or more pronounced as in resistant Kubanka parent. It is suggested that the heterozygote arose as result of simultaneous crossing over engaging 2 pairs of chromosomes. Resistant wheat has less technical value than either parent. —*L. R. Waldron.*

280. Wright, Sewall. **Correlation and causation.** Jour. Agric. Res. **20**: 557–585. *16 fig.* Jan. 3, 1921.—Formulae are derived to measure the direct influence of one variable on another assuming that the direct influence of the given variable on the other can be measured by the standard deviation remaining in the effect after all other extraneous influences are eliminated. The expression $\sigma_{A.X}$ is used for the standard deviation of X due to A. Path

coefficient for the path from A to X is defined as the ratio of the standard deviation of X due to A divided by the total standard deviation of X.

$$P_{X.A} = \frac{\sigma_{X.A}}{\sigma_X}$$

The deviation of X directly caused by a unit deviation of A is

$$P_{X.A}\frac{\sigma_X}{\sigma_A} = \frac{\sigma_{X.A}}{\sigma_A}$$

The coefficient of determination of X by A, '$dX.A$' measures the fraction of complete determination for which factor A is directly responsible in a given system of factors.—These formulae are developed and illustrated for systems of independent causes, chains of causes, non-additive factors, non-linear relations, effects of common causes and systems of correlated causes. Their relation to multiple correlation is shown and general formulae are developed. Illustrative material is given on birth weight of guinea-pigs and on transpiration of plants.—*John W. Gowen.*

HORTICULTURE

J. H. GOURLEY, *Editor*

H. E. KNOWLTON, *Assistant Editor*

FRUITS AND GENERAL HORTICULTURE

(See also in this issue Entries 3, 12, 15, 30, 40, 47, 48, 50, 57, 69, 76, 78, 160, 221, 242, 255, 263, 339, 415, 425, 428, 430, 432, 434, 435, 444, 445, 446, 447, 465, 498, 524, 530, 552)

281. ANONYMOUS. [Rev. of: FLETCHER, S. W. **The strawberry in North America: history, origin, botany, and breeding.** *xiv + 234 p.* Macmillan Co.: New York, 1917.] Sci. Prog. [London] **14**: 350. 1919.

282. BALLOU, F. H. **An orchard tragedy.** Monthly Bull. Ohio Agric. Exp. Sta. **6**: 9–11. *Fig. 1–2.* 1921.—The article contains a discussion concerning tillage-cover-crop versus grass mulch practice in a hillside orchard as based upon tests upon hilly land in southern Ohio. In spite of careful cultural work the tillage-cover-crop section was in deplorable condition at the end of the test. Orchardists are adopting the mulching method because it results in equally generous fruit production, is less expensive, less difficult, and less dangerous.—*R. C. Thomas.*

283. BALLOU, F. H. **Ensee apple. An Ohio variety coming into prominence.** Monthly Bull. Ohio Agric. Exp. Sta. **6**: 12–13. 1921.—Origin, similarity to the Rome Beauty, and merits of the Ensee apple are discussed.—*R. C. Thomas.*

284. BROWN, G. G. **The orchard-fertility problem.** Agric. Jour. [British Columbia] **5**: 326, 354–355; **6**: 20–21. 1921.—This report summarizes the results of orchard fertilizer experiments in other stations and compares them with results obtained by the Oregon Agricultural experiment station. Special emphasis is placed upon the use of alfalfa as a permanent shade crop and the effect of chemical manures, especially nitrate, on the growth of alfalfa. It emphasises the fact that legumes used as cover crops do not need added nitrogen, but rather are harmed by it; and that the growing of a legume, with possibly the addition of some acid phosphate and potash, may prove to be a good system for maintaining orchard fertility.—*A. F. Barss.*

285. H., T. A. [Rev. of: NEWLAND, H. OSMUN. **The planting, cultivation and expression of cocoanuts, kernels, cocoa, and edible vegetable oils and seeds of commerce. A practical handbook for planters, financiers, scientists and others.** *vi + 111 p., 11 pl.* Charles Griffin

and Co.: London, 1919.] Nature 106: 564. 1920.—The author has attempted too much in a small space and has not used it to best advantage.—*O. A. Stevens.*

286. Haseman, L. **Federal and state laws regulating the propagation and distribution of nursery stock.** Missouri Agric. Exp. Sta. Circ. 99. *24 p.* 1920.

287. Manuel, H. L. **"Yema" budding of the vine.** Agric. Gaz. New South Wales **32**: 197–199. *3 fig.* 1921.—Budding is done when sap is flowing, but after period of greatest vigor of growth in order to produce a good callus. Buds are inserted 1 inch above level of soil; the bud is then covered well with soil and unmounded in spring when bud is ready to expand. An excellent callus forms during dormancy.—*L. R. Waldron.*

288. Morel, F. **Vignes de jardins et raisins de table.** [**Garden vines and table grapes.**] Rev. Hort. **93**: 228. 1921.—Somewhat detailed descriptions are given of a number of seedings of cold- or disease-resistant grapes, and their general adaptability is discussed.—*E. J. Kraus.*

289. Stahl, J. H. **Recent development in small fruits.** Agric. Jour. [British Columbia] **6**: 46–48. *2 fig.* 1921.—An address given at the annual meeting of Western Horticulturists, Vernon, British Columbia.—*J. W. Eastham.*

290. Thayer, Paul. **Characteristics of peach varieties.** Monthly Bull. Ohio Agric. Exp. Sta. **6**: 3–8. 1921.—The relative time of picking the earlier varieties is fixed. Sixty-four varieties are discussed according to time of picking, flavor, size, color, and susceptibility to disease. Mayflower, Victor, Japan Blood Dwarf, Amsden, June Elberta, Early Rose, Greensboro, McNeil's Early, Admiral Dewey, Triumph, Waddell, Eureka, Champion, Smock, and Lemon Free are included in the list.—*R. C. Thomas.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

291. Anonymous. [Rev. of: Webster, A. D. **London trees: an account of the trees that succeed in London, with descriptive account of each species and notes on their comparative value and cultivation. With guide to where the finest London trees may be seen.** *8 vo, xii + 218 p., 32 pl.* Swarthmore Press: London.] Jour. Botany **59**: 79–81. 1921.

292. Barnhart, J. H. **Jeffersonia diphylla.** Addisonia **5**: 31, 32. *Pl. 176 (colored).* 1920.—A description and the botanical history of the plant, which is native of eastern U. S. A., is given. It is worthy of a place in the flower garden.—*T. J. Fitzpatrick.*

293. Boynton, Kenneth R. **Diplotaxis tenuifolia.** Addisonia **5**: 3, 4. *Pl. 162 (colored).* 1920.—The wall-rocket, of the mustard family, a native of Europe, is of possible value in a flower garden because of the pleasing combination of the pale green foliage and light yellow flowers.—*T. J. Fitzpatrick.*

294. Boynton, Kenneth R. **Lilium henryi.** Addisonia **4**: 65, 66. *Pl. 153 (colored).* 1919.—This lily is a native of central China, introduced into cultivation in 1898.—*T. J. Fitzpatrick.*

295. Boynton, Kenneth R. **Platycodon grandiflorum.** Addisonia **5**: 13, 14. *Pl. 167 (colored).* 1920.—The Japanese bellflower, native of eastern Asia. It was introduced into the botanic garden at Vienna in 1775 and later into England. This perennial blooms during the summer and early fall and is a satisfactory permanent feature of the flower garden.—*T. J. Fitzpatrick.*

296. Boynton, Kenneth R. **Poinsettia heterophylla.** Addisonia **4**: 77, 78. *Pl. 159 (colored).* 1919.—An annual ornamental herb, native of central and western U. S. A., introduced into cultivation in about 1885.—*T. J. Fitzpatrick.*

297. Britton, Elizabeth G. **Adlumia fungosa.** Addisonia **5**: 21, 22. *Pl. 171 (colored).* 1920.—The climbing fumitory is native of northeastern U. S. A. and Canada. It grows readily from seed and its ornamental flowers make it a valuable addition to the flower garden.—*T. J. Fitzpatrick.*

298. Britton, N. L. **Cephalanthus occidentalis.** Addisonia **5**: 17, 18. *Pl. 169 (colored).* 1920.—This button-bush is of wide distribution in North America. It prefers wet soil or swamps and is not readily transplanted except when young, and then only to places similar to its native habitat.—*T. J. Fitzpatrick.*

299. Burkill, I. H. **Annual report of the Director of Gardens for the year 1919.** *5 p.* Government Press: Singapore, 1921.—An administration report upon the Botanic Gardens, Singapore, and the Waterfall Gardens, Penang.—*I. H. Burkill.*

300. Clément, G. **Pyramides japonaises de chrysanthèmes.** [**Japanese pyramidal chrysanthemums.**] Rev. Hort. **93**: 226–228. *Fig. 59.* 1921.—Methods of culture and a list of varieties best adapted to the training in this manner are given.—*E. J. Kraus.*

301. Gleason, H. A. **Dracocephalum speciosum.** Addisonia **5**: 27, 28. *Pl. 174 (colored).* 1920.—An ornamental mint, native of the northern Mississippi valley. It has been in cultivation since 1825.—*T. J. Fitzpatrick.*

302. Gleason, H. A. **Vernonia crinita.** Addisonia **5**: 11, 12. *Pl. 166 (colored).* 1920.—This ironweed is a native of the Ozark region of the U. S. A. It is too large and coarse for the small flower garden, but it may be naturalized to advantage in poor soils along walls, fences, in strips fronting scrub or dry woods, in open places and clearings. When established it maintains itself and does not become a pest.—*T. J. Fitzpatrick.*

303. Labroy, O. **Bougainvillea glabra et B. spectabilis. Notes du Bresil.** [**Bougainvillea glabra and B. spectabilis. Notes from Brazil.**] Rev. Hort. **93**: 229–230. 1921.—Comparative descriptive notes and cultural suggestions are presented.—*E. J. Kraus.*

304. Lesourd, W. **Dahlias simples "Etoile Digoinaise."** [**Single dahlias "Etoile Digoinaise."**] Rev. Hort. **93**: 232–233. *Fig. 60–61.* 1921.—The progenitor of this race of single dahlias was discovered by a Mr. L. Martin of Dijon 16 years ago. Since that time the present type has been selected and perfected in a number of colors. The flowers are star shaped, each petal has the edges of the outer two-thirds rolled in toward the center line, and since the back of the petal is of a different color than the face the effect is striking. It is well adapted for cutting and decorative purposes. There are a number of named varieties.—*E. J. Kraus.*

305. Maron, C. **Cattleya Rutilant.** Rev. Hort. **93**: 230. *1 pl (colored).* 1921.—This variety, which produces intensely colored, medium sized flowers of a purple crimson color, is the result of a cross between *Cattleya Maroni* = (*C. velutina* × *C. aurea*) and *C. vigeriana* = (*C. aurea* × *C. labiata*). Of special interest is the fact that the flowers are of medium size, although three-fourths of the ancestry possessed large flowers.—*E. J. Kraus.*

306. Moutte, V. **La lavande.** [**The lavender.**] Rev. Eaux et Forêts **59**: 11–18. 1921.—In the mountains of southeastern France lavender is a product of considerable importance to foresters. During recent years prices for essence of lavender have risen so greatly that artificial cultivation has been undertaken. Yields vary from 5 kg. of essence,—worth 150 francs per kg.,—in uncared for natural stands, to 24 kg. per hectare in highly cultivated areas. France's total estimated production in 1912 was 60,000 kg., with England as its only serious competitor. The growing and harvesting of lavender provides a considerable industry on lands otherwise unsuitable for cultivation, and it is an open question whether settlement in the mountains should not be encouraged by setting apart for this purpose certain of the better areas in the reforestation zones.—*S. T. Dana.*

307. Nash, George V. **Amygdalus davidiana.** Addisonia **5**: 9, 10. *Pl. 165* (*colored*). 1920.—This peach was discovered in 1867 by Abbé David near Pekin, China, and later introduced by him into England. The ornamental flowers, appearing early, produce fruit of no value. The tree may prove of value for grafting stock.—*T. J. Fitzpatrick.*

308. Nash, George V. **Aphalandra nitens.** Addisonia **5**: 23, 24. *Pl. 172* (*colored*). 1920.—A highly ornamental plant of the Acanthus family, native of Columbia. It was introduced into England in 1867. It is readily propagated by cuttings and thrives under greenhouse cultivation.—*T. J. Fitzpatrick.*

309. Nash, George V. **Benzoin aestivale.** Addisonia **5**: 15, 16. *Pl. 168* (*colored*). 1920.—This spice-bush of the laurel family is a native of northeastern U. S. A. and Ontario. It is well adapted to the winter garden in low damp situations. The bright yellow flowers appear in early spring before the leaves and the bright red fruit in August and September.—*T. J. Fitzpatrick.*

310. Nash, George V. **Bryophyllum crenatum.** Addisonia **4**: 63. *Pl. 152* (*colored*). 1919.—A native of central Madagascar and a succulent of easy culture.—*T. J. Fitzpatrick.*

311. Nash, George V. **Bulbophyllum grandiflorum.** Addisonia **4**: 71, 72. *Pl. 156* (*colored*). 1919.—A large-flowered ornamental plant from New Guinea, recently receiving attention from culturists.—*T. J. Fitzpatrick.*

312. Nash, George V. **Corylopsis spicata.** Addisonia **5**: 19, 20. *Pl. 170* (*colored*). 1920.—This shrub belongs to the witch-hazel family and is a native of southern Japan. The flowers and leaves are highly ornamental. Propagation may be effected by seed or by layering.—*T. J. Fitzpatrick.*

313. Nash, George V. **Crataegus calpodendron.** Addisonia **4**: 67, 68. *Pl. 154* (*colored*). 1919.—This decorative pear thorn is a native of the eastern U. S. A. It is the *Crataegus tomentosa* of authors. As the red fruit persists until the following spring the plant is desirable as an ornamental shrub.—*T. J. Fitzpatrick.*

314. Nash, George V. **Elaeagnus multiflora.** Addisonia **4**: 69, 70. *Pl. 155* (*colored*). 1919.—A much-branched shrub, native of China and Japan, with highly ornamental flowers and fruit.—*T. J. Fitzpatrick.*

315. Nash, George V. **Euonymus patens.** Addisonia **4**: 75. *Pl. 158* (*colored*). 1919.—A shrub of decorative value, native of central China. It was introduced into the U. S. A. by George H. Hall in 1860.—*T. J. Fitzpatrick.*

316. Nash, George V. **Rosa "Dr. Van Fleet."** Addisonia **5**: 7, 8. *Pl. 164* (*colored*). 1920.—This garden hybrid was produced in 1907 by pollinating with a hybrid between *Rosa wichuraiana* and *R. safrano*. This rose is a climber with shining leaves and flesh-pink flowers, and is much admired.—*T. J. Fitzpatrick.*

317. Nash, George V. **Viburnum dilatatum.** Addisonia **5**: 1, 2. *Pl. 161* (*colored*). 1920.—A highly ornamental Viburnum, native of China and Japan, introduced into England about 1875, and since widely cultivated.—*T. J. Fitzpatrick.*

318. Proschowsky, R. **Au sujet de fruits comestibles de Chamaerops humilis et d'autres palmiers rustiques.** [**Concerning edible fruits of Chamaerops humilis and other hardy palms.**] Rev. Hort. **93**: 230–231. 1921.—Several species have produced individuals having edible fruit of fair quality. These include *Chamaerops humilis* L.; *Phoenix canariensis* Hort. var *edulis*; and *Butia capitata* Beccari vars. *pulposa* and *pygmaea*. Other genera which should be examined for possible valuable selections are *Sabal*, *Erythea*, and *Brahea*.—*E. J. Kraus.*

319. Sands, W. N. **Bougainvillaeas.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. St. Vincent 1918-19: 1–2. 1920.—The following varieties of *Bougainvillaea* are under cultivation: *B. glabra* (light magenta), *B. Sanderiana* (magenta), *B. spectabilis* var. *laterita* (terra-cotta), and *B.* var. "Mrs. Butt" (crimson). Artificial crosses of these lead to the opinion "that the magenta color in the bracts is dominant over crimson and terra-cotta reds as all hybrids raised in the W. I., so far as known, in which a magenta-bracted species or variety was one of the parents, have produced magenta-coloured bracts." The period between pollination of flowers and ripening of seed is about 30 days, and the seed, which resemble grains of wheat, germinate in about 10 days in partially sterilized soil. Seedlings are rather difficult to raise.—*J. S. Dash.*

320. Small, John K. **Hydrangea quercifolia.** Addisonia 5: 29, 30. *Pl. 175 (colored).* 1920. —An ornamental shrub, native of Georgia, Florida, Alabama, and Mississippi. It has been in cultivation for over a century in the U. S. A. and England. It is hardy at least 1000 miles north of its natural habitat.—*T. J. Fitzpatrick.*

321. Small, John K. **Leucothoe catesbaei.** Addisonia 4: 61, 62. *Pl. 151 (colored).* 1919.—An evergreen shrub, native of the southern Appalachians and adjacent highlands. This dog-laurel was early introduced into European gardens and is now widely cultivated as an ornamental shrub.—*T. J. Fitzpatrick.*

322. Small, John K. **Pieris floribunda.** Addisonia 5: 5, 6. *Pl. 163 (colored).* 1920.—A mountain fetter-bush, native of the southern Alleghanies, evergreen, highly ornamental, introduced into England in 1811. This shrub is easy of cultivation, grows rapidly, and is hardy far north of its natural range.—*T. J. Fitzpatrick.*

323. Watson, Elba E. **Corylus rostrata.** Addisonia 5: 25, 26. *Pl. 173 (colored).* 1920.—The beaked hazel-nut is a native of North America. It is of value because of the edible fruit, a small nut.—*T. J. Fitzpatrick.*

VEGETABLE CULTURE

324. Keil, J. B. **The gardener and the seedsman.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 14–15. 1921.—A few essential considerations should be kept in mind when selecting vegetable seeds. A scale for rating seedsmen is given.—*R. C. Thomas.*

325. Rosa, J. T., Jr. **Sweet potato culture in Missouri.** Missouri Agric. Exp. Sta. Circ. 103. *12 p.* 1921.

326. Sosa, H. A. **La mandioca.** [Cassava.] Defensa Agric. [Uruguay] 1: 336–338. 1920.—The culture of cassava (*Manihot* sp.) is discussed.—*John A. Stevenson.*

HORTICULTURE PRODUCTS

327. Mach, F., und M. Fischler. **Die Zusammensetzung der Moste des Jahres 1919 in Baden.** [Musts of 1919 in Baden.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 72–77. 1920.

328. Marcailhou d'Aymeric, A. **Analyse d'un vin de palmier ou "laghmi" du Sud-Tunisien.** [Analysis of a palm-wine or "laghmi" of southern Tunis.] Jour. Pharm. et Chimie 23: 272–273. 1921.—The wine has a sp. gr. of 1.0295 and contains 2 per cent of glycerin, 3 of gum, 7 of mineral matter, and, after allowing it to stand for about 1 week, 4.5 per cent of alcohol by weight. The wine is obtained by puncturing the palms of the oasis Gabès. It flows at the rate of 7–8 l. per day for 1 month. The puncture is closed with vegetable matter or dirt and the tree regains its normal appearance after 1 year. The wine is consumed by the natives very frequently immediately after collecting, even before fermentation has started.—*H. Engelhardt.*

329. Schellbach, H., und Fr. Bodinus. **Über Vanillin-Erzeugnisse. [Vanilla products.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel **40**: 34–37. 1920.

330. Stern, J. **Moste des Jahres 1919 aus den Weinbaugebieten der Nahe, des Glaus, des Rheintales unterhalb des Rheingaues, des Rheingaues, des Rheins, Mains und der Lahn. [Musts of 1919 in the Rhine valley, etc.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel **40**: 78–80. 1920.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

(See also in this issue Entries 62, 175, 226, 380, 405, 453)

331. Balasubramanyam, M. **Variegation in certain cultivated plants.** Jour. Indian Bot. **1**: 325–329. *Pl. 3.* 1920.—From an examination of leaf structure of cultivated ornamental plants with variegated leaves, the author concludes that there are 3 kinds of mesophyll in the leaf—palisade above, spongy below, and a distinct type between. Variegations are due to varying amounts or complete absence of chlorophyll in these 3 layers.—*Winfield Dudgeon.*

332. Buchholz, John T. **Polyembryony among Abietineae.** Bot. Gaz. **69**: 153–167. *15 fig.* 1920.—Not all Abietineae show a complete separation of the 4 primary embryos, as is characteristic of *Pinus*. The cleavages separating the 8 embryos are the free nuclear divisions of the proembryo. In *Picea* and other forms without cleavage polyembryony, cell divisions homologous with those in *Pinus* occur in the proembryo. The Abietineae embryos may be arranged in an intergrading series, with *Pinus* at one end and *Pseudotsuga* at the other, on the basis of the occurrence of cleavage polyembryony, rosette embryos, and the apical cell; the rosette embryos and their vestiges, the rosette cells, are gradually eliminated from *Pinus* to *Pseudotsuga*. Cleavage polyembryony, rosette embryos, and the apical cell mark a primitive type of embryo development. The embryo development of this group shows how the apical cell was lost in the evolution of the Abietineae. On the basis of embryogeny *Pseudotsuga* is unique and clearly entitled to generic rank.—*H. C. Cowles.*

333. Bugnon, P. **Causes du parcours transversal des faisceaux libéro-ligneux aux noeuds des Graminées. [The cause of the transverse course of the fibrovascular bundles at the nodes of grasses.]** Compt. Rend. Acad. Sci. Paris **171**: 673–675. *Fig. 1–3.* 1920.—A continuation of a study reported in a recent number of this journal (see Bot. Absts. 7, Entry 1060). The change in direction of the bundles at the nodes is attributed to lack of space or necessary tissue, and to the readiness with which transverse bundles can be formed at this level.—*C. H. Farr.*

334. Buscalioni, L. **Sui tricomi delle Felci con particolare riguardo alle Parafisi. [On the trichomes of ferns with particular regard to the paraphyses.]** Malpighia **28**: 545–554. 1920.—The article completes a study of the structure and function of fern paraphyses. The peculiar structure of these organs in different species of ferns suggests their use as a basis for comparison in systematic study. Paraphyses function as a means of protection to the sporangia, either mechanically or by reason of substances contained in them, and possibly serve also in regulating the dissemination of spores.—*Edith K. Cash.*

335. Church, A. H. **Elementary notes on the reproduction of angiosperms.** Bot. Mem. [Oxford] 5. *23 p.* 1919.—These are notes apparently used by the author in connection with some of his courses in botany.—*J. S. Cooley.*

336. Church, A. H. **Elementary notes on structural botany.** Bot. Mem. [Oxford] 4. *27 p.* 1919.—These are notes used by the author in connection with some of his courses in botany.—*J. S. Cooley.*

337. Church, A. H. **On the interpretation of phenomena of phyllotaxis.** Bot. Mem. [Oxford] 6. *58 p.* 1920.—Fibonacci phyllotaxis, as a phase of plant symmetry, is reduced to a condition of centric, axial growth-extension, combined with the outthrust in rythmic sequence of somatic protrusions in the transverse plane. To maintain the older inherent centric organization, the Fibonacci angle, 137° 30′ 28″, must be approximated every time, though the range of error may be considerable in the individual units. Actual measurements show that the general plan keeps very fairly adjusted in such divergent types as *Quinqueloculina, Cystoseira, Polytrichum*, and *Sempervivum*. Taking the general progression of Fibonacci phyllotaxis as the expression of an archaic method of initiating one lateral extension of the soma at a time, from a growth center or a differentiated growing point, the more fundamental and primary relations of living plasma, established once and for all, even in the plankton-phase, may remain predominant throughout all future phases of progression. All primary problems of stem and root, leaf and branch, members and tissues, cells and space-form, are to be sought far behind the comparatively modern and wholly secondary subaerial environment in which we find ourselves in the more familiar vegetation of the land.—*F. V. Rand.*

338. Merriman, Mabel L. **The receptacle of Achillea millefolium L.** Torreya 21: 21–24. *Fig. 1–5.* 1921.—The receptacle of *Achillea* is usually described as flat or convex, but specimens from the vicinity of New York City examined in October, 1919, showed a conical or oblong head. Further study in 1920 showed that while heads with flat receptacles bore an average of 12 flowers per head, the conical heads had from 23 to 27. The projection of the tubular beyond the ray-flowers, which is less than 1 mm. in the flat heads, was as much as 11 mm. in the conical forms. In some cases ray-flowers were interspersed with the tubular flowers on the elongated receptacle. Further experiments are suggested to determine whether in these elongated receptacles we have mutating characters or reversions. It is suggested that soil-content and seasonal conditions may have some influence.—*J. C. Nelson.*

339. Prayag, S. H. **Some observations on the inflorescence and flowers of the grape.** Agric. Jour. India 16: 60–64. *Pl. 8–9.* 1921.

340. St. John, Harold. **A freak sweet clover.** Rhodora 23: 25–26. 1921.—A description of a teratological specimen of *Melilotus alba* from Goldendale, Washington, characterized by an inflorescence with branching pedicels, which thus formed a panicle instead of the usual simple spike. In addition the pistil was foliaceous with 2 or 3 ovules borne on each of the slightly adnate edges.—*James P. Poole.*

341. Vuillemin, Paul. **Les aberrations de la symétrie florale.** [Various types of floral symmetry.] Compt. Rend. Acad. Sci. Paris 172: 35–39. 1921.—The author distinguishes 3 main types of floral form: Asymmetric, spiromorphic, and symmetric. The last named may be either actinomorphic or zygomorphic. *Actinomorphosis* refers to the substitution of the actinomorphic for the zygomorphic or the asymmetric; and *zygomorphosis* to the substitution of the zygomorphic for the actinomorphic or the asymmetric. Actinomorphosis is equivalent to some of the cases which have been called peloric, but not to all. The condition of zygomorphosis has not in the past been much studied. These types may vary in the plane of symmetry and in the configuration, position, or number of the floral parts. They may be exogenous or endogenous, the latter presenting either synanthy or paranthy. The paper includes a description of these types as they are found in *Tropaeolum majus.*—*C. H. Farr.*

342. Weatherwax, Paul. **Position of scutellum and homology of coleoptile in maize.** Bot. Gaz. 69: 179–182. *11 fig.* 1920.—The evidences derived from the structure and development of the maize embryo, including that of the ligule-less mutant, favor the idea that the coleoptile is the homologue of a foliage leaf, and that the cotyledon is a lateral organ.—*Paul Weatherwax.*

343. Wisselingh, C. van. **Bijdragen tot de kennis van de zaadhuid. Tiende bijdrage. Over de zaadhuid van Reseda luteola L., Parnassia palustris L., Viola odorata L., Daphne mezereum L., Eleagnus edulis Siebold, Aucuba japonica Thunb. en Pirola rotundifolia L.** [Contributions to a knowledge of the seed coat. Tenth contribution.] Pharm. Weekbl. 58: 298–308, 326–342. *Pl. 2, fig. 22.* 1921.—In continuation of the author's previous studies [see Bot. Absts. 3, Entries 2453, 2809; 8, Entries 444, 445], the ovules of the above species are described, particular attention being paid to the structure and development of the integuments in the ovule and to the changes which they undergo as the ovule ripens into the seed. Cuticles and cork layers are especially studied.—*H. Engelhardt.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. Transeau, *Editor*

(See in this issue Entry 373)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

Alexander W. Evans, *Editor*

344. Church, A. H. **Thallassiophyta and the subaerial transmigration.** Bot. Mem. [Oxford] 3. *95 p.* 1919.—See Bot. Absts. 7, Entry 2007.

345. Dismier, G. **Notes sur les Fissidens serrulatus Brid. et Fissidens polyphyllus Wils** [Notes on Fissidens serrulatus and F. polyphyllus.] Rev. Bryologique 47: 54–56. 1920.—The geographical distribution and differential characters of *Fissidens serrulatus* and *F. polyphyllus* are discussed, emphasis being laid on certain anatomical features first pointed out by Bottini. So far as France is concerned the distribution of *F. serrulatus* is essentially Mediterranean, while that of *F. polyphyllus* is exclusively oceanic.—*A. W. Evans.*

346. Herzog, Th. **Beiträge zur Bryogeographie Südosteuropas.** [Contributions to the bryogeography of southeastern Europe.] Krypt. Forsch. Bayer. Bot. Ges. München 4:274–298. 1919.—The author participated with a German unit in military operations in the Balkans during the late war. As opportunity offered he made bryological observations and collections. The paper is divided into 2 parts, of which the 1st deals with Macedonia and the 2nd with the Transylvanian Alps of the Rumanian border. Lists of mosses and hepatics are given, together with a discussion of points of geographical and ecological interest. The Macedonian flora is primarily Mediterranean, that of the Rumanian mountains northern. As new species (both from the Cherna bend region of Macedonia) appear *Orthotrichum insidiosum* and *Mielichhoferia paradoxa*, the latter supposedly a relict of an ancient tropical or subtropical flora.—*A. LeRoy Andrews.*

347. Potier de la Varde, R. **Contribution à la flore bryologique du Kikouyou (Afrique orientale anglaise).** [Contribution to the bryological flora of Kikuyu (British East Africa).] Rev. Bryologigue 47: 49–54. *6 fig.* 1920.—This report is based on a collection made by J. Soul in the vicinity of Nairobi, during the years 1912 and 1913. The species listed number 29, full data regarding localities being given under each. The following species are described as new and figured: *Anomobryum sulcatum* Thér. & P. de la V., *Bryum Soulii* Thér. & P. de la V., *Hylophila acuminata* Broth. & P. de la V., *Philonotis Soulii* P. de la V., and *Tortella Therioti* Broth. & P. de la V. Two new varieties are likewise described and the capsule of *Lindbergia patentifolia* Dixon, hitherto unknown, is figured.—*A. W. Evans.*

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. Fitzpatrick, *Editor*

FUNGI

(See also in this issue Entries 151, 219, 492, 515, and those in the section Pathology)

348. Anonymous. **Auskunft über Speisepilze.** [Information concerning edible fungi.] Naturwiss. Zeitschr. Forst- u. Landw. 18: 278–279. 1920.—*Agaricus melleus*, well known in Germany as a serious enemy of soft woods, is described with reference to its life-history, morphology, edibility, etc. The edible qualities and food possibilities of the species are emphasized; a recipe for cooking is given.—*J. Roeser.*

349. Chipp, T. F. **A list of the fungi of the Malay Peninsula.** Gardens Bull. Straits Settlements 2: 311–418. 1920.—A complete list of the known fungi of the Peninsula with localities and hosts.—*I. H. Burkill.*

350. Church, A. H. **Elementary notes on the morphology of fungi.** Bot. Mem. [Oxford] 7. *29 p.* 1920.—These are notes apparently used by the author in connection with some of his courses in botany.—*J. S. Cooley.*

351. Clayley, Dorothy M. **Some observations on the life-history of Nectria galligena Bres.** Ann. Botany 35: 79–92. *Pl. 4, 5., fig. 1–25.* 1921.—A study of the morphology and cultural characters of a fungus isolated from an apple canker in Britain. The writer agrees with Weese that the Nectria which has been shown to form definite cankers on beech and other trees, and which has been discussed in literature under the name *Nectria ditissima* Tul., should be called *N. galligena* Bres. This fungus grew well and completed its life-history on a starch medium containing 1 per cent glycerine. All stages of the fungus,—microspores, macrospores, and perithecia,—develop normally on potato slants with 1 per cent glycerine, the latter being the only medium found on which the fungus developed perithecia. Pycnidia were found on bark but no mature pycnidia were seen in pure culture on artificial media. There is thus insufficient proof that pycnidia occur in the life-history of *N. galligena*.—Several ascogonia occur in the young perithecium; these degenerate and disappear before the formation of the asci. The ascogenous hyphae, from which the asci develop, arise *de novo* from cells at the base of the perithecium, the nuclei of which have the same characteristics as the nuclei of the ascogonia. The further development of the perithecium could not be followed.—*W. P. Fraser.*

352. Garrett, A. O. **Smuts and rusts of Utah — IV.** Mycologia 13: 101–110. 1921.—The paper includes discussions of 5 smuts and 45 rusts. *Hilaria Jamesii* is reported as a new host for *Ustilago Hypodytes* (Schlecht.) Fries, and *Lepidium perfoliatum* and culivated *Tropaeolum* as new hosts for *Puccinia subnitens* Dietel.—*H. R. Rosen.*

353. Gloyer, W. O. **Septoria leaf blight on the China aster.** [Abstract.] Phytopathology 11: 50–51. 1921.—A new disease of China aster (*Callistephus chinensis*) has been under observation in New York State since 1915. The leaves are spotted and finally killed by *Septoria Callistephi* n. sp.—*B. B. Higgins.*

354. Grove, W. B. **Mycological notes.—V.** Jour. Botany 59: 13–17. 1921.—The new combination *Boydia insculpta* (Oud.) Grove is made, it being shown that several species supposed by various authors to be distinct are really forms of the same species. A collection of undoubted *Puccinia Peucedani-parisiensis* (DC.) Lindr. from Britain is discussed. Notes are included on some fresh collections of *Phomopsis abietina* Grove. [See also Bot. Absts. 8, Entry 1294.]—*K. M. Wiegand.*

355. Guiart, J. **Considerations sur le mycetome, a propos d'un cas nouveau. [Considerations upon mycetomes with reference to a new case.]** Compt. Rend. Soc. Biol. Paris 83: 277–278. 1920.—In a mycetome with white grains of the Aspergillus type a thin pigment layer was found which leads the author to conclude that this is a step in the transition from the white-grained to dark-grained type, and that accordingly the genera *Indiella* and *Madurella* are the same fungus in respectively the white-grain and dark-grain stage of development of the mycetome.—*E. A. Bessey.*

356. Horne, Arthur S. **Diagnoses of fungi from spotted apples.** Jour. Botany 58: 238–242. 1920.—The new genus Polyopeus is described, and a synopsis of the 4 species included is given. The genus is referred to the Hyphomycetes. The following new species and varieties are given: *Pleospora pomorum, Fuckelia botryoidea, Coniothyrium cydoniae* Brun. var. *mali, C. convolutum, Alternaria pomicola,* and *Sclerotium stellatum.*—*K. M. Wiegand.*

357. Murrill, W. A. **A new bolete from Porto Rico.** Mycologia 13: 60–61. 1921.—A species with pale, ellipsoidal spores is described as *Gyroporus Earlei* sp. nov.—*H. R. Rosen.*

358. Murrill, W. A. **Light-colored resupinate polypores — III.** Mycologia 13: 83–100. 1921.—A continuation of studies previously reported (see Bot. Absts. 8, Entry 466). In this paper rose-colored, lilac, red and purple species of *Poria* are described. Among the 26 species treated, the following are new: *Poria albirosea, P. subundata, P. subincarnata* (Peck), *P. Dodgei, P. Bracei,* and *P. subbadia.*—*H. R. Rosen.*

359. Murrill, W. A. **Two species of Fuscoporia.** Mycologia 13: 119. 1921.—Two new combinations are made based on dark-colored species previously included in *Poria.* They are *Fuscoporia tenerrima* (Berk. & Rav.), and *F. nebulosa* (Berk. & Curt.).—*H. R. Rosen.*

360. Murrill, W. A. **A double mushroom.** Mycologia 13: 119–122. *Fig. 1–3.* 1921.—A peculiar carpophore of *Agaricus campestris* is described in which there are 2 sets of gills as well as 2 stems. An appearance is given such as would exist if the caps of 2 mushrooms occurring side by side had entirely grown together and the stronger mushroom had lifted the other into the air. Comparable abnormalities in other gill-fungi are noted.—*H. R. Rosen.*

361. Murrill, W. A. **The genus Tinctoporia.** Mycologia 13: 122–123. 1921.—Three new combinations are made and the forms described. *Tinctoporia aurantiotingens* (Ellis & Macbr.) Murrill becomes *T. albocincta* (Cooke & Masse) comb. nov. on the basis of priority; the other new combinations are *T. graphica* (Bres.) based on *Poria graphica,* and *T. Fuligo* (Berk. & Br.), based on *Polyporus* (*Poria*) *Fuligo.*—*H. R. Rosen.*

362. Pennell, Francis W. **Index to American mycological literature.** Mycologia 13: 126–128. 1921.

363. Puttemans, A. **Gloeosporium Bombacis, n. sp.** Bull. Soc. Path. Veg. France 7: 74–75. 1920.—The above fungus found on *Bomax* (*Pachyra*) *insignis* in the vicinity of Sao Paulo, Brazil, is described and its effect upon the host indicated. Bordeaux mixture is suggested as a control measure.—*C. L. Shear.*

364. Reinking, Otto A. **Higher Basidiomycetes from the Philippines and their hosts I.** Philippine Jour. Sci. 15: 479–490. 1919. [See also the 3 following entries.]

365. Reinking, Otto A. **Higher Basidiomycetes from the Philippines and their hosts II.** Philippine Jour. Sci. 16: 167–179. 1920.—Identification of the higher Basidiomycetes collected on Mount Maquiling and in the vicinity of Los Baños, Laguana Province, Luzon, in Mindanao, and in Sulu, with special reference to the host plants. [See also the preceding entry and the 2 following ones.]—*Albert. R. Sweetser.*

366. Reinking, Otto A. **Higher Basidiomycetes from the Philippines and their hosts III.** Philippine Jour. Sci. 16: 527–537. 1920. [See also the following entry and the 2 preceding ones.]

367. Reinking, Otto A. **Higher Basidiomycetes from the Philippines and their hosts IV.** Philippine Jour. Sci. 17: 363–374. 1920. [See also the 3 preceding entries.]

368. Seaver, Fred J. **Photographs and descriptions of cup-fungi—IX. North American species of Discina.** Mycologia 13: 67–71. *Pl. 4.* 1921.—The genus *Discina* is described and is interpreted as including large cup-fungi which have appendiculate spores. Four species are recognized and described, including *D. apiculata* (Cooke) Seaver, comb. nov., and *D. convoluta* Seaver, sp. nov.—*H. R. Rosen.*

369. Speare, A. T. **Massospora cicadina Peck—a fungus parasite of the periodical cicada.** Mycologia 13: 72–82. *Pl. 5–6.* 1921.—An extensive mycological study of the fungus, including both the conidial and resting spore stages. It is shown to belong to the Entomophthorales.—*H. R. Rosen.*

370. Stone, R. E. **Leaf scorch or mollisiose of strawberry.** [Abstract.] Phytopathology 11: 44. 1921.—A leaf disease of strawberries, serious in certain parts of Ontario, Canada, is due to *Marssonina Potentillae.* This fungus has been proved to be the conidial stage of *Mollisia Earliana* (E. & E.) Sacc.—*B. B. Higgins.*

371. Weiss, Harry B., and Erdman West. **Additional fungous insects and their hosts.** Proc. Biol. Soc. Washington [D. C.] 34: 59–62. 1921.—A list of insects found on various fungi is given.—*J. C. Gilman.*

372. Wormald, H. **On the occurrence in Britain of the ascigerous stage of a "brown-rot" fungus.** Ann. Botany 35: 125–135. *Pl. 6–7, fig. 1–9.* 1921.—The author describes a Sclerotinia found on mummified plums. Cultures from single ascospores gave conidia of the *Monilia cinerea* type. The spores agreed in size with those produced in culture from conidia taken from plums naturally infected with *M. cinerea.* Inoculations on plum flowers and fruit and cherry fruit with conidia obtained from cultures gave infection, while inoculations on apple flowers were not followed by invasion of the flowering spurs. Inoculations with a strain of *Monilia* isolated from a dead flowering spur of apple gave ready invasion of the flowering axis. The fungus is referred to *Sclerotinia cinerea* (Bon.) Schröter. The author also compares the brown-rot Sclerotinias and concludes that the *Monilia* strain obtained from North America is very similar to the gray *Monilia* common in Britain, but differs from the latter in its mode of growth in culture. Strains of *Monilia* from plum obtained in France and Holland proved similar in form to those in Britain. The American Sclerotinia appears, therefore, to be a distinct species, or at least a form culturally distinct from the European *Monilia cinerea* Bon. The Sclerotinias occurring on apricots and cherries in Europe show no essential morphological differences. Further study is needed to determine whether they are culturally or biologically distinct.—*W. P. Fraser.*

LICHENS

373. Church, A. H. **The lichen as transmigrant.** Jour. Botany 59: 7–13, 40–46. 1921.—In a previous paper (see Bot. Absts. 8, Entry 477) the author has suggested that lichens, or at least the fungous part, have arisen from algal ancestors. In the present paper it is pointed out that the intrusion of algal gonidia is not an unusual phenomenon, as the intrusion of photosynthetic as well as non-photosynthetic bodies occurs in a great many aquatic animals and plants. Many examples are given. It is the fungus which must be considered in phylogeny. Instead of flagellated zooids, the ancestors of the Ascomycetes probably had an open hymenium with asci discharging their spores by hydrostatic tension; the perithecium is more recent. Numerous small ascocarps, as in most lichens, is a more primitive condition than

a single large cup, as in *Peziza*. It is among the lichen-forming Ascomycetes that the most prominent suggestion of vestigial sexual organs occurs. Though curiously parallel, the Florideae and the lichens have no direct connection. The higher algae present a firm cortical layer resistant to intrusion and therefore the gonidia of lichens did not intrude during life in the open sea but probably in pools. It may be suggested that fungal hyphae represent the internal heterotropic portion of a seaweed with the cortical photosynthetic layers lost because of lack of oxygen. The complex soma of higher fungi simply represents the "skinned" soma of a complex alga, hence the striking similarities in reproduction. The algae of the lichen gonidia have penetrated later into the denuded algal soma; in this connection the attachment of unicellular algae to denuded seaweeds in pools is noted. The lack of sufficient oxygen for respiration at night in pools probably led to the death of the cortical layer, and probably to migration to subaerial ("splash") habitats. The first stage of migration to the land is shown by seaweeds living above the surface, but within the region of "splash." Lack of nitrogen and water keep the lichen thallus small after emergence. Resistance to drought is not characteristic of lichens, occurring also in some algae and fungi. Lichens are probably the oldest surviving race of land plants. It remains to show the course of evolution in the reproductive processes. The lichens and fungi are evidently polyphyletic.—*K. M. Wiegand.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. Berry, *Editor*

(See also in this issue Entries 332, 339, 373, 512)

374. Arber, Agnes. **Water plants: a study of aquatic angiosperms.** *xvi + 436 p., 171 fig.* Cambridge Univ. Press. 31s. 6d. 1920.—The book contains much of interest from the standpoint of phylogeny and evolution. [See also Bot. Absts. 9, Entry 380.]—*E. W. Berry.*

375. Berry, Edward W. **A Potamogeton from the Upper Cretaceous.** Amer. Jour. Sci. **1**: 420–423. *Fig. 1–3.* 1921.—A very characteristic Potamogeton, *P. perryi*, is described from the Ripley formation, late Upper Cretaceous, of western Tennessee.—*E. W. Berry.*

376. Carpentier, Alfred. **Découverte du genre Plinthiotheca Zeiller dans le Westphalien du nord de la France.** [Discovery of the genus Plinthiotheca Zeiller in the Westphalian of northern France.] Compt. Rend. Acad. Sci. Paris **172**: 814–815. 1921.—This form, described originally from Heraclée, Asia Minor, is recorded from Pas-de-Calais. It is interpreted as a microsporophyll, elliptical in form and about 11 × 21 mm, in size, with one surface covered with microsporangia. It is considered to represent the microsporophyll of either *Linopteris obliqua* or *Neuropteris gigantea*.—*E. W. Berry.*

377. Chudeau, R., et P. H. Fritel. **Quelques bois silicifiés du Sahara.** [Several silicified woods from the Sahara.] Bull. Soc. Géol. France **20**: 202–207. *Fig. 1.* 1920.—The general occurrence and varied age of sandstones with silicified wood throughout northern Africa are discussed. Three specimens of wood from the Sahara sandstone are described which are referred to the recently proposed form genus *Mesembryoxylon* Seward, and are considered as probably of Cretaceous age.—*E. W. Berry.*

378. Coleman, A. P. **Paleobotany and the earth's early history.** Amer. Jour. Sci. **1**: 315–319. 1921.—A criticism, from the standpoint of physical geology, of Knowlton's thesis of uniform geologic climates under the influence of terrestrial heat.—*E. W. Berry.*

379. Depape, G. **Sur la présence du Juglans cinerea L. fossilis Bronn dans la flore plaisancienne de Saint-Marcel-d' Ardéche.** [On the presence of Juglans cinerea L. in the Pliocene of Saint-Marcel-d' Ardéche.] Compt. Rend. Acad. Sci. Paris **171**: 865–866. 1920.

380. Guppy, H. B. **Evolution of water plants.** [Rev. of: Arber, Agnes. **Water plants: a study of aquatic angiosperms.** *xvi* + *436 p.* University Press: Cambridge, 1920 (see Bot. Absts. 9, Entry 374).] Nature 106: 462–463. 1920.

381. Fritel, P. H. **Sur l'existence de l'Oeillette (Papaver somniferum var nigrum DC.) en Provence, a l'époque quaternaire.** [On the existence of the poppy in the Pleistocene of Provence.] Bull. Soc. Géol. France 20: 207–208. *Fig. 1.* 1920.—A well preserved capsule of a poppy from Aygalades, Bouches-du-Rhone, contained in a tuff of middle Pleistocene age is described and figured.—*E. W. Berry.*

382. Janet, Chas. **Considerations sur l'être vivant. Première partis. Résumé préliminaire de la constitution de l'orthobionte.** [Considerations on the living being. Part one, Preliminary résumé of the organization of the orthobiont.] *80 p., 1 pl.* Beauvais. 1920.—Study of ontogeny shows that all life springs from a single initial form—a phyto-zoo-flagellate, extraterrestrial in origin. Primordial assemblages of cells are called "merismes." Cells are of two kinds,—plano-plastids (flagellated) and aplano-plastids (non-flagellated), one form leading to the other. The primitive cell is eventually imperishable. A merisme consisting of a sporadic swarm with its derivative, the filament (of *Ulothrix*), and to transformations of that filament, is given the name "plethea." The first cell is a proplastid; cells in process of division are ontoplastids; products of division forming the merisme are teleplasts. Teleplasts are eventually imperishable (gonidia) and are apt to develop into new merismes. Planoplastids of the plethea may develop into a new merisme, the blastea, a spherical sheet formed of a single layer of cells. The type of this process is furnished by the ontogeny of the blastea of *Volvox*, stages of which are seen in the development of Algae, Bryophyta, Pteridophyta, and Anthophyta. The blastea of the phyto-zoo-flagellate may be considered as being represented by the blasteas of the phyto-flagellates, the Chlorophyceae, and the zoo-flagellates. Its proplastid is a planoplastid transformed by conditions into an aplanoplastid. There is a pletheoblasteen alternation in the primitive living form: (1) Alternation of plethea and blastea, resulting in plano-spores; (2) intercalary alternations of plethea and blastea, resulting in plano-spores; (3) male and female gametes; (4) parthenogenesis where there is failure of conjugation. Development that has its birth with the zygote disappears with the death of its merismes or terminates in a new zygote constituting a "holobiont." A line of merismes leading directly from an initial zygote to a first new zygote is an "orthobiont," which may be simple or double (with parthenogenetic alternation). The orthobiont is the essential element of phyletic lines. Phyto-flagellates and zoo-flagellates considered without regard to the divergences of the phyla differ merely in the mode of nutrition. The Volvocaceae are purely blastean chlorophytes in which occurs the differentiation into vegetative and sexual cells. In the unbranched Chlorophyceae, *Ulothrix* (a purely gonidial form) is directly derived from a chlorophyllian phyto-flagellate. The Chlorophyceae are pletheoblastean in nature. Departing from *Ulothrix* a differentiation of this state leads by way of the branched Chlorophyceae to the proto-archegoniate ancestor of the primitive eu-archegoniate, whence are directly derived the related groups, Bryophyta and Pteridophyta. The gymnosperms, or astigmates, are derived from a heterosporous pteridophyte of the extinct group of Cycadofilices. The angiosperms, or stigmates, are derived either from a pteridophyte of the Cycadofilices group related to that from which the gymnosperms originated, or from a primitive gymnosperm.—The primitive animal, the zoo-flagellate, or protozoan, is an orthobiont, simple or exceptionally double (parthenogenesis). The somatic animal, or metazoan, is derived from an ancestral zoo-flagellate with a simple orthobiont. The orthobiont of the insect, which is taken as a type, comprises an initial blastea plus alternation of plethea and blastea, plus blastea. The zygote develops into a blastea which in the very beginning differentiates into (1) soma and (2) a gonidium of the orthobiontic value of a spore. The germ is the product and direct descendant of the spore or primordial germinal cell which constitutes the single and precocious gonidium of the initial blastea.—*Winifred Goldring.*

383. Reynolds, S. H. **The lithological succession of the carboniferous limestone (Avonian) in the Avon Section at Clifton, Bristol.** [Abstract.] Ann. and Mag. Nat. Hist. 7: 255–256. 1921.—Among other things regarding the rocks of the Avon Section the author says that the 3 Modiola phases (calcareous-lagoon phases) of Kn, C_2–S_2, and the top of S_2 recognized by Dixon in Gower, are represented in the Avon Section, and that with them are constantly associated calcareous algae. The upper S_2 Zone is largely algal in origin, the Cotham-Marble-like layers consisting of *Mitcheldeania* or *Spongostroma*. The former is the most persistent calcareous alga, ranging from the base of the section to the top of S_2. *Ortonella* is characteristic of the K beds. *Solenopora* is also found here. *Spongiostroma* is the prevalent organism in many of the calcite-mudstones of C_2 and S. *Girvanella* is found in D_1, and *Aphralysia* in C_2 and S. The "Seminula-pisolite" structure of Vaughan proves to be of algal origin. [From author's abstract of a paper read at the meeting of the Geological Society.]—*H. H. Clum.*

384. Schuchert, C. **Evolution of geologic climates.** Amer. Jour. Sci. 1: 320–324. 1921.—Knowlton's conclusions that climate in the past was uniform and mild is criticized, and it is concluded that "throughout its history the earth has had temperature zones, varying from an intensity as marked as that of today to almost complete absence, so that the greater part of the earth had an almost uniformly mild climate, without winter."—*E. W. Berry.*

385. Stevens, Neil E. **Two petrified palms from interior North America.** Amer. Jour. Sci. 1: 431–443. *Fig. 1–16.* 1921.—*Palmoxylon cheyennense* is described in detail from the Pierre Cretaceous of South Dakota, and *Palmoxylon cannoni* from the lower part of the Denver formation (Eocene) of Colorado.—*E. W. Berry.*

386. T., H. H. [Rev. of: Scott, D. H. **Studies in fossil botany.** Vol. 1, *3rd ed., 8vo., 434 p., 190 fig.* A. & C. Black: London, 1920.] Jour. Botany 59: 53–55. 1921.

387. Twenhofel, W. H. **The Comanchean and Dakota strata of Kansas.** Amer. Jour. Sci. 49: 281–297. 1920.—The paper contains a number of references to the Dakota flora.—*T. J. Fitzpatrick.*

388. Wieland, G. R. **Paleobotany as viewed by two geologists.** Science 53: 437–439. 1921.—A note on geological climates.—*E. W. Berry.*

PATHOLOGY

G. H. Coons, *Editor*

C. W. Bennett, *Assistant Editor*

(See also in this issue Entries 5, 6, 15, 27, 30, 39, 40, 46, 47, 48, 50, 58, 82, 91, 139, 230, 235, 288, 349, 352, 353, 362, 363, 364, 365, 366, 367, 370, 529, 530)

PLANT DISEASE SURVEY; REPORT OF OCCURRENCE AND SEVERITY

389. Anonymous. **Report on the prevalence of some pests and diseases in the West Indies during 1918.** West Indian Bull. 18: 34–60. 1920.—A compilation from the reports of the principal agricultural officers in each of the colonies under the auspices of the Imperial Department of Agriculture. The degree of prevalence of the various diseases attacking local crops is given with suitable notes.—*J. S. Dash.*

390. Butler, E. J. **Report of the Imperial Mycologist.** Sci. Rept. Agric. Res. Inst. Pusa 1919–20: 58–67. 1920.—The report is a statement of progress in a number of lines of investigation. In "black band" of jute (*Corchorus olitorius* and *C. capsularis*), caused by *Diplodia Corchori* Syd., red-stemmed varieties are found to be slightly less susceptible than others; treatment of seed with fungicides is of little value, as the spores are not disseminated

along with seed to any appreciable extent.—Spraying was continued in orchards in Kumaon (outer Himalayas).—Identification of, and inoculation experiments in, *Fusarium*, *Helminthosporium*, *Acrothecium*, and *Rhizoctonia* diseases of cereals is in progress.—Rot in stored potatoes appears to be due to excessive temperature, and not primarily to fungous invasions.—A root rot of cotton (*Gossypium*) appears to be associated with some unknown soil conditions.—A fungous flora of India is in preparation. "The total number of recorded species is probably under 2000, which is certainly not one-fourth of those that exist."—The report closes with a program for work in 1920–21, and a list of publications for the year.—*Winfield Dudgeon.*

391. Nowell, W. **A disease of coco-nut.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. St. Lucia 1918–19: 7. 1920.—Diseased specimens when received by the author were in bad condition; nevertheless a phycomycete resembling *Pythium* or *Phytophthora* was much in evidence on the central shoot and unexpanded leaflets. Because of parasitic habits of this group, this organism is suspected of having etiological relationships. Question arises whether this fungus is related to *Pythium palmivorum*, the bud-rot organism of the East recently suspected of causing coconut disease in Jamaica. Fructifications in the St. Lucia fungus are round or nearly so, and resemble the zoosporangia of *Pythium deBaryanum* more than do the pear-shaped Phytophthora-like sporangi of *Pythium palmivorum* and the Jamaica species. Further investigation is needed. Meanwhile, Bordeaux or Burgundy mixture, preferably with milk or resin soap to increase adhesion, is recommended for controlling the disease.—*J. S. Dash.*

392. Schmitz, Henry. **Observations on some common and important diseases of the rhododendron.** Phytopathology 10: 273–278. *11 pl.* 1920.—The important diseases of the rhododendron on the Pacific coast are summarized as follows: *Sporocybe azaleae*, *Melampsoropsis piperiana*, witches' brooms, white leaf, *Lophodermium rhododendri*, *Coccomyces dentatus*, *Coryneum rhododendri*, *Sphaerella rhododendri*, *Pestalozzia guepini*, and *Cryptostictis* sp. The symptoms of all these diseases are described and control measures are suggested for some.—*Ruth G. Bitterman.*

393. Schneider, Georg. **Der Kartoffelkrebs, eine eigenartige neue Kartoffelkrankheit in Deutschland. [The potato wart, a peculiar new potato disease in Germany.]** *8 p., 5 fig.* P. Parey: Berlin, 1918.—(Mitteil. K. Marine-Intendantur, Wilhelmshaven.)—A circular for the practical gardener and farmer giving the history and distribution of the potato wart disease in Germany, and an account of the life history of the pathogene. Emphasis is placed on the fact that this disease may become a serious factor in field potato culture although it is now restricted to home gardens in industrial centers where continuous potato culture is practiced and field sanitation unknown. Recommendations for preventing its further spread are given and the experience of England with the potato wart disease is cited as a warning to Germany.—The spread of initial infection is thought to be due to penetration of the deeper-lying tissues by swarm-spores liberated in the superficial tissue layers. The finding of sporangia in the base of an epidermal hair is reported.—*F. Weiss.*

394. Taylor, H. V. **The distribution of wart disease.** Jour. Ministry Agric. Great Britain 27: 733–738, 863–867. 1920.

395. Taylor, H. V. **The distribution of wart disease.** Jour. Ministry Agric. Great Britain 27: 946–953. 1921.

396. Voglino, P., e V. Bongini. **Malattie riscontrate nel mese di Dicembre. [Diseases observed in December.]** Pubbl. Mens. R. Osservatorio Fitopatol. Torino 1: 2–3. 1919.—The list of diseases includes apricot gummosis, *Polyporus igniarius* on cherry, *Botrytis cinerea* and *Gymnosporangium tremelloides* on apple, *Fusicladium pirinum* on pear, *Bacillus ampelopsorae* on grape, *Sclerotinia libertiana* on carrot, lettuce bacteriosis, and *Phytophthora infestans* on potato.—*Edith K. Cash.*

397. Voglino, P., e V. Bongini. **Malattie riscontrate nel mese di Gennaio.** [Diseases observed in January.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino. 2: 2–3. 1919.—The following fungous and bacterial diseases are mentioned: *Clasterosporium carpophilum* on apricot, cherry, and almond, mulberry root-rot, *Septoria limonum* on lemon, *Botrytis cinerea* on apple, peach gummosis, *Septoria veronicicola* on *Veronica formosa*, *Phoma viticola* and *Baccillus ampelopsorae* on grape, *Sclerotinia libertiana* on carrot, *Polydesmus exitiosus* on cauliflower, *Septoria dianthi* on carnation, *Bremia lactucae* on lettuce, *Fusarium solani* and *Phytophthora infestans* on potato.—*Edith K. Cash.*

398. Weston, William H., Jr. **Another conidial Sclerospora of Philippine maize.** Jour. Agric. Res. 20: 669–684. *Pl. 76–78.* 1921.—A new species of *Sclerospora* (*S. spontanea*) has been found producing mildew of maize and rarely of sugarcane and bugang grass (*Saccharum officinarum*) in the Visayan Islands of Cebu, Bohol and Leyte. It is indistinguishable from *Sclerospora philippinensis*, previously described, in its virulence, host range, and in the symptoms produced on the various hosts in the field. However, extensive studies of fresh material show this species to be morphologically distinct from *S. philippinensis* and other oriental forms. Teosinte and *Miscanthus japonicus* have been infected by inoculation. The author is of the opinion that the oriental downy mildews are native on wild grasses.—*H. E. Thomas.*

THE PATHOGENE: BIOLOGY; INFECTION PHENOMENA; DISPERSAL

399. Rosen, H. R. **The behavior of telia of Puccinia graminis in the South.** Mycologia 13: 111–113. 1921.—Telia of *Puccinia graminis* as a rule are not abundant in the South, and those which are found are often undersized and fail to develop viable teliospores. The exception noted is the production of normal telia in the fall on *Elymus australis*. The teliospores on this host were successfully overwintered and infections were obtained on barberry.—*H. R. Rosen.*

400. Walkden, H. **The isolation of the organism causing crown gall on Chrysanthemum frutescens in Britain.** Ann. Botany 35: 137–138. 1921.—The writer describes an organism isolated from crown gall on *Chrysanthemum frutescens*. Inoculations on healthy plants reproduced the galls, and the organism was repeatedly re-isolated from the galls produced in this way. The characters of this organism proved identical with those of an authentic culture of *Bacterium tumefaciens*.—*W. P. Fraser.*

401. Wartenweiler, Alfred von. **Beiträge zur Systematik und Biologie einiger Plasmopara-Arten.** [Contribution to the taxonomy and biology of some species of Plasmopara.] Ann. Mycol. 16: 249–298. *3 pl., 12 fig.* 1918.—As a result of extensive morphological studies of conidia and conidiophores from *Plasmopara nivea* (Ung.) Schrœt., *P. pygmaea* (Ung.) Schrœt., and *P. densa* (Rabh.) Schrœt. from different hosts, *P. nivea* is separated into 6 forms: (a) On various umbellifers, (b) on *Anthriscus silvester* and *A. cerefolium*, (c) on *Conium maculatum*, (d) on *Laserpitium latifolium*, (e) on *Angelica refracta*, (f) on *Peucedanum palustre*. *Plasmopara pygmaea* is divided into 4 forms: (a) On *Anemone canadensis* and *A. caroliniana*, (b) on *Anemone raddeana* and *A. flaccida*, (c) on *Astragene alpina*, (d) on *Anemone hepatica*. In *P. densa* some variations in conidia and conidiophores are found but no division of the species is made. Graphs are given of a large number of spore measurements, mostly from 500 to 1000 from each of the different host plants. Mycelium of *P. nivea* found in the rhizomes of *Laserpitium latifolium* is described and illustrated. Whether this mycelium is in all cases perennial or not is connected with the question as to the first infection, which has not yet been determined. Other hosts showed no mycelium in rhizomes. The few inoculation experiments made were unsatisfactory and mostly negative. It is stated that if a generalization can be made from this study it is that the fungous forms from similar regions are in many, but by no means all, cases similar; but these similar forms do not occur on closely related hosts.—*C. L. Shear.*

THE HOST (RESISTANCE; SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

402. Kottur, G. L., and M. L. Patel. **Malformation of the cotton plant leading to sterility.** Agric. Jour. India 15: 640–643. *Pl. 43–45.* 1920.—Malformation of the cotton plants shows itself when 2–3 months old. The leaves are smaller and bunched, at first of an unusual dark green color changing to reddish and pinkish yellow as the malformation advances; the plants die without producing seed. The disease does not occur among American and Egyptian varieties. The Indian cottons, Surtee-Broch, Goghari and Wagod, are most affected. Light rainfall seems to favor the disorder and it is worse on alkali lands and where cotton is grown continuously without rotation. Where light soil is used the affection is less. The disease is not hereditary.—*J. J. Skinner.*

403. Lees, A. H. **Reversion of blackcurrants: A method of identification.** Jour. Ministry Agric. Great Britain 27: 1122–1127. *7 fig.* 1921.—Leaves on reverted plants produce fewer submain veins and the leaf edges are less serrated. The abnormality begins about the middle of May; the early leaves may be normal. Propagation from normal stock and the rogueing of diseased individuals are recommended as control measures.—*C. W. Bennett.*

404. Sundberg, Roberto. **Causas y sintomas de enfermedades en las plantas. [Causes and symptoms of plant diseases.]** Defensa Agric. [Uruguay] 1: 131–133, 160–163. 1920.—A very general account of the relation of heat, light, water, soil, and cultural conditions to health in plants.—*John A. Stevenson.*

405. Vincens, M. F. **Note sur les formations ligneuses anormales dans l'écorce de l'Hevea brasiliensis. [Note on abnormal woody formations in the bark of Hevea brasiliensis.]** Compt. Rend. Acad. Sci. Paris 171: 871–873. 1920.—Three types of abnormal woody formations are indicated by bark irregularities: (1) The healed wounds from bleeding, (2) small, somewhat pointed projections, of disputed origin, with a hard woody core, often independent of the normal wood or joined to it by a short slender strand, (3) plates made up of branched and interwoven strands of variable diameter (1 mm. to 1 cm.) and considerable extent. Sections show structure similar to secondary wood surrounding some cells which appear dead but on staining with Sudan III were shown to be laticiferous and to communicate with other cells of the same type. The strands are surrounded by generative tissue. Rutgers studying this condition in Java reported that the death of the central cells was caused by *Phytophthora Faberi.* Vincens' observations from Cochin China do not support this view. He fails to find mycelium necessarily associated with the production of these structures but always finds a bacterium and sometimes also a *Fusarium,* but thinks the latter negligible since no mycelium was observed. Many bacteria live in the latex.—*Eloise Gerry.*

DESCRIPTIVE PLANT PATHOLOGY

406. Anonymous. **El carbon volante del trigo. [Loose smut of wheat.]** Defensa Agric. [Uruguay] 1: 312–318. *5 fig.* 1920.—A description of the disease caused by *Ustilago tritici,* which has been very prevalent in Uruguay, is given.—*John A. Stevenson.*

407. Anonymous. **Enfermedades de las plantas producidas por hongos. [Plant diseases produced by fungi.]** Defensa Agric. [Uruguay] 1: 79–83. *7 fig.* 1920.—A popular account of fungi as to structure, spore production, and spore germination.—*John A. Stevenson.*

408. Anonymous. **Potato disease (blight [Phytophthora infestans]) in 1920.** Jour. Ministry Agric. Great Britain 27: 1146–1147. *1 fig.* 1921.

409. Anonymous. **Sugar cane disease.** South African Sugar Jour. 5: 201–203. 1921.—An account of the sugar cane diseases in Natal and Zululand is given. The diseases listed are as follows: A root disease caused by a soil fungus, *Himantia stellifera,* which has also been

observed on the "umthente" grass (*Imperata arundinacea*); two leaf spot diseases,—the ring spot caused by *Leptosphaeria sacchari*, and the eye spot caused by *Helminthosporium sacchari;* and 2 stalk diseases caused by *Melanconium sacchari*, the "rind disease" fungus, and *Cephalosporium sacchari*. *Colletotrichum falcatum* has not been observed here. *Schizophyllum commune* has been found in Zululand on old cane stalks lying on the ground, but never on standing cane. The fungus is common everywhere on old stumps and logs of various trees, and occurs also as a wound parasite of fruit trees. In addition to these diseases caused by fungi, there is a physiological trouble,—the occurrence in the internodes of strips of spongy tissue or cavities surrounded by spongy tissue. The cells of the spongy tissue are dead, filled with air, and no sucrose collects in them. Such spongy stalks are readily attacked by fungi.—*E. K. Tisdale.*

410. Anonymous. **Wither-tip and brown rot of plums.** Jour. Ministry Agric. Great Britain **27**: 1142–1145. *6 fig.* 1921.

411. Arnaud, G. **Une maladie bactèriene du lierre (Hedera Helix L.). [A bacterial disease of Hedera Helix.]** Compt. Rend. Acad. Sci. Paris **171**: 121–122. 1920.—A disease caused by *Bacterium hederae* n. sp., is found occurring on the leaves. It may be distinguished from that caused by *Phyllosticta* by the transparency of the leaf spots.—*C. H. Farr.*

412. Ashby, S. F. **Notes on two diseases of the coco-nut palm in Jamaica caused by fungi of the genus Phytophthora.** West Indian Bull. **18**: 61–73. 1920.—Part 1 of the article deals with a bud rot caused by *Phytophthora palmivora.* The macroscopic and microscopic characters of the disease are given, as well as results of inoculations from pure cultures. Identification of the pathogene, its distribution, infection, spread, and treatment are fully dealt with. Comparisons are made with other types of bud rot.—Part II treats of a leaf-stalk rot caused by *P. parasitica.* Notes on the symptoms, etiology and control are recorded.—*J. S. Dash.*

413. Chen, Chunjen C. **[Some important cotton diseases.]** Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] **6**: 168–175. 1921. [Text in Chinese.]—The cause, symptoms, means of transmission, and control of the following important cotton diseases are reviewed: Angular leaf spot, anthracnose, wilt, root-knot, potash-hunger, damping-off, root rot, Diplodia boll rot, shedding of bolls and squares, leaf spot, and club-leaf.—*Chunjen C. Chen.*

414. Dufrenoy, Jean. **Sur des tumeurs bactèriennes expérimentales de l'Epicea. [Bacterial tumors experimentally produced on Picea.]** Compt. Rend. Acad. Sci. Paris **171**: 874–876. *Fig. 1–3.* 1920.—Cambium of the canker may be used to infect a healthy tree. Bacteria found in the cankers are described but are not named.—*C. H. Farr.*

415. Giaccone, V. **Los principales enemigos del viñedo. [The principal enemies of the vineyard.]** Defensa Agric. [Uruguay] **1**: 67–70. 1920.—A popular account of the more important parasitic and non-parasitic diseases of the grape, including *Oidium, Plasmopara,* "black-rot," chlorosis, and root rot.—*John A. Stevenson.*

416. Girardi, José. **La chlorosis de las plantas. [Chlorosis of plants.]** Defensa Agric. [Uruguay] **1**: 300–302. 1920.

417. Girardi, José. **Tumor bacteriano del duraznero. [Bacterial tumor of the peach.]** Defensa Agric. [Uruguay] **1**: 279–281. *1 fig.* 1920.—A gall forming disease of the peach said to be distinct from crown gall (*Bacterium tumefaciens*) is described and attributed to *Bacterium persicae,* n. sp.—*John A. Stevenson.*

418. Graebner, Paul. **Lehrbuch der nichtparasitären Pflanzenkrankheiten. [Textbook of non-parasitic plant diseases.]** *vii* + *333 p., 245 fig.* Paul Parey: Berlin, 1920.—In a concise textbook written from the standpoint of both the gardener and botanist, the writer seeks to cover the diseases and weakened conditions of plants brought about by non-parasitic

agencies in which parasites are at least secondary. For the most part the book aims to give a short presentation of the material for teaching purposes, rather than a fuller presentation, such as given by Sorauers' Handbuch der Pflanzenkrankheiten, I. The book, however, uses the plates from the Sorauer text and the arrangement of the material is similar. Following a general introduction dealing briefly with the history of the subject, the concept of disease, and the causes of plant disease, the relation of climate and geographical location and plant disease is outlined. In the main body of the work the form of presentation is largely descriptive, and the material is presented under 6 topics: (1) Unfavorable soil; (2) air conditions (moisture, dryness, wind); (3) heat and light; (4) wounds; (5) injurious gases and liquids; (6) enzymatic diseases (panachure, mosaic, gum and resin flow). The book is indexed and some literature references are made.—*G. H. Coons.*

419. Hudig, J., en C. Meyer. **De Veenkoloniale haverziekte III.** [The marsh-colony disease of oats, III.] Verslag. Landbouk. Onderzoek. Rijkslandbouwproefsta. 23: 1–39. *Fig. 1–15.* 1919.—In pure quartz sand free from organic substances, oats may be grown in a mixture of salt solutions which are basic, though the plants should not have too long a period of growth. An addition of roots of oats, stalks of oats, and cotton batting to the sand in quantities of 0.75–2 per cent causes the disease, independent of early or late sowing or cold or warm weather. The presence of a basic fertilizer is necessary. Under the same conditions extracts of roots of oats have the same effect as added pieces of roots. Leaves of oats added in the same quantities have a favorable effect upon the plants. Sand cultures to which acid salts or nitrites are added never develop the disease. Manganese sulphate appears best suited to combat the disease. [See also following entry.]—*J. C. Th. Uphof.*

420. Hudig, J., en C. Meyer. **De Veenkoloniale haverziekte IV.** [The marsh-colony disease of oats, IV.] Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. 23: 128–158. *Fig. 1–8.* 1919.—The disease, which may become very dangerous, appears as a striped chlorosis and is caused by alkali in the soil solution. A decoction of decomposing cellulose in sand containing alkali may cause the disease; potato starch has the same effect. Material containing cellulose is harmless if the environment is acid; also if manganese sulphate or sulphur is applied. Sulphur flour is oxidized to sulphuric acid in aerobic sand cultures. [See also preceding entry.]—*J. C. Th. Uphof.*

421. Jagger, Ivan C. **A transmissible mosaic disease of lettuce.** Jour. Agric. Res. 20: 737–739. *Pl. 87.* 1921.—The disease occurs in Florida, North Carolina, and New York.—Romaine lettuce (Paris White Cos) and head lettuce (Big Boston) are affected. Typical mottling and wrinkling occur. All variations are found from very slight mottling with no apparent injury to pronounced mottling and very evident dwarfing of plants. Transmission experiments with the aphid, *Myzus persicae,* were successful.—*D. Reddick.*

422. Nowell, W. **The red ring disease of coco-nut palms.** West Indian Bull. 18: 73–76. 1920.—A more complete report is given on infection experiments carried out in Grenada, West Indies, which supplements earlier notes on the same subject (see Bot. Absts. 4, 1327). The results support the idea that infection occurs in the leaf bases, and may frequently take place by way of the small cracks formed by the bending outwards of the leaf as it matures. This would render untenable a previous hypothesis that infection takes place at an early age, the effects manifesting themselves only on the maturing of the tree.—*J. S. Dash.*

423. Oortwijn Botjes, J. G. **De bladrolziekte van de aardappelplant.** [Leafroll disease of the potato plant.] *136 p. 8 pl.* Wageningen, 1920.—The primary symptoms can easily be mistaken for those of other diseases, but the secondary ones are definite and in this period occurs the rolling up of the leaves. On infested plants grown from healthy tubers, symptoms often can not be noticed during the 1st period of growth. The necrosis of the phloem is typical and this is accompanied by a retardation in the transfer of starch. External symptoms can be observed about 10–30 days after the tubers start growth. Leafroll disease is contagious;

the cause is unknown. Transfer of the infection takes place through agency of plant lice. Artificial inoculations have failed; soil infection seems to be excluded. Some strains are resistant, others are not; selection of resistant plants is advisable.—*J. C. Th. Uphof.*

424. Yeh, Yuen Ting. [Translation of: Cook, O. F. **A disorder of cotton plants in China: Club-leaf or Cyrtosis.** Jour. Heredity **11**: 99–110. 1920 (see Bot. Absts. 8, Entry 532).] Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kan [China Cotton Jour.] 2^2: 235–240. *Fig. 1–10.* 1921.

ERADICATION AND CONTROL METHODS

425. Anonymous. **Calendario para los tratamientos preventivos y curativos de las plantas.** [Calendar of preventive treatments and remedies for plant diseases.] Defensa Agric. [Uruguay] **1**: 61–64. 1920.—Treatments recommended for pests and fungous diseases of pear, apple, plum, and other fruits are outlined.—*John A. Stevenson.*

426. Anonymous. **Cura de las semillas de triga.** [Treatment of seed wheat.] Defensa Agric. [Uruguay] **1**: 115–119. *6 fig.* 1920.—The paper outlines copper sulphate and formalin treatments of seed wheat as smut preventives.—*John A. Stevenson.*

427. Anonymous. **The inspection of potato crops during 1920.** Jour. Ministry Agric. Great Britain **27**: 954–957. 1921.

428. Anonymous. **E mildiou o blanco de los zapallos.** [Cucumber mildew.] Defensa Agric. [Uruguay] **1**: 12–13. 1920.—Bordeaux treatment is advised for powdery mildew (*Oidium* sp.) of cucumbers.—*John A. Stevenson.*

429. Berg, R. C. van den, Rzn. **Ontsmettingsproef tegen steenbrand by tarwe.** [Treating wheat against stinking smut.] Tijdschr. Plantenz. **27**: 17–19. 1921.—In this experiment 125 l. of wheat, smutted artificially by mixing with 100 cc. of smut kernels (*Tilletia tritici*), were treated in part with copper sulphate and in part with Uspulun. In the 1st case the seed was sprinkled thoroughly with a solution of copper sulphate (100 gm. of copper sulphate dissolved in 1.25 l. of water for every 50 l. of grain). In the 2nd case it was sprinkled with Uspulun (20 gm. of Uspulun dissolved in 4 l. of water for every 50 l. of grain). In both cases the seed was thoroughly mixed during the sprinkling and was planted immediately after treatment. The following numbers give the results in the various plats, in terms of smutted heads in 780 heads: Untreated—52, 69; Uspulun—11, 9, 28; copper sulphate 1, 0, 0.—*D. Atanasoff.*

430. Birmingham, W. A. **A treatment for tomato wilt on trial.** Agric. Gaz. New South Wales **32**: 212. 1921.—A popular treatment for tomato wilt was tried with negative results.—*L. R. Waldron.*

431. Bovell, J. R. **Plant inspection and fumigation.** Rept. Dept. Agric. Barbados **1917-1918**: 31–32. 1920.—When the Bourbon cane succumbed to the attacks of *Colletotrichum falcatum* it was replaced by the White Transparent, which often grew in the same hole as badly attacked Bourbon canes, but remained resistant. It now appears, according to the author, that after many years of cultivation in the Colony, the White Transparent has lost its immunity to the disease in question. *Cercospora vaginae* and *Marasmius sacchari* were also in evidence and will continue so long as planters do not select cane-planting material more carefully. The green scale, *Coccus viridis*, was successfully controlled by spraying with spores of *Cephalosporium lecanii* suspended in water.—*J. S. Dash.*

432. Eastham, J. W., and E. C. Hunt. **Spraying for apple scab in the Kootenays.** Agric. Jour. [British Columbia] **6**: 38–39. 1921.—Results are recorded of comparative tests with lime-sulphur and the modified Bordeaux mixture with soluble sulphur as calyx spray recom-

mended in Nova Scotia. The Bordeaux gave satisfactory results in scab control and increased yield in the case of McIntosh and Northern Spy, especially the former. 10 per cent russeting occurred in McIntosh; the amount was negligible in Northern Spy. Foliage was better throughout the season on the Bordeaux plot. Sulphur dust, with arsenate of lead added for one application only, gave very poor results, the percentage of scab being as high as 89 on McIntosh. Sander's "Copper dust" gave good results under similar conditions.—*J. W. Eastham.*

433. Fantini, Nicolás. **La antracnosis y medios de curación.** [Anthracnose and its cure.] Defensa Agric. [Uruguay] **1**: 179–180. 1920.—Popular discussion of grape anthracnose (*Gloeosporium ampelophagum*).—*John A. Stevenson.*

434. Fromme, F. D., G. S. Ralston, and J. F. Eheart. **Dusting experiments in peach and apple orchards in 1920.** Virginia Agric. Exp. Sta. Bull. 224. *12 p., 1 fig.* 1921.—A sulphur dusting mixture (80 parts sulphur, 10 parts hydrated lime, 10 parts arsenate of lead) gave very satisfactory control of peach scab, but the data on brown-rot were insufficient to furnish a basis for conclusions. Severe cracking of peach fruits resulted from excessive applications of the dust. Three dusts were used on apples: Sulphur dust, copper-lime dust, and Bordeaux dust. The 1st proved much more effective in the control of apple scab than either of the other 2 mixtures, and gave results almost as good as those obtained on the spray plots. Neither of the copper dusts proved at all effective in the control of bitter-rot on apples. A comparison of the results of the season's tests with those of previous years in Virginia is included.—*F. D. Fromme.*

435. Giaccone, V. **Como curar el duraznero en primavera y principio de verano. [Treatment of the peach in spring and early summer.]** Defensa Agric. [Uruguay] **1**: 293–294. *2 fig.* 1920.—Treatment for *Exoascus deformans* and *Aphis persicae* is given.—*John A. Stevenson.*

436. Hardenburg, E. V. **Seed potato problems.** Potato Mag. **3**[10]: 22–23, 25, 30. 1921.—Variety tests require several strains from a variety group that has been found suitable locally. Careful attention may prevent degeneration. Seed certification helps to supply good seed because of its effect in controlling leafroll and mosaic. For 5 or more acres, an isolated seed plot is desirable. Usually not enough seed per acre is planted.—*Donald Folsom.*

437. Martin, William H. **A comparison of inoculated and uninoculated sulfur for the control of potato scab.** Soil Sci. **11**: 75–85. *Pl. 1, fig. 1–3.* 1921.—Uninoculated commercial flour sulphur and commercial flour sulphur inoculated with 1 per cent of soil from a compost heap known to contain sulphur oxidizing organisms, was added to the soil just before planting potatoes in scab infested land. Hydrogen-ion exponents of soil samples taken from plots treated with inoculated sulphur were lower than of those treated with uninoculated sulphur. In most instances the increase in acidity was accompanied by a corresponding decrease in the number of unsalable scabby potatoes. [See also following entry.]—*W. J. Robbins.*

438. Martin, William H. **Relation of sulfur to control of potato scab.** Potato Mag. **3**[9]: 5–6, 22–23. *4 fig.* 1921. [See also preceding entry.]

439. N [orris], F. de la M. **Notes on the field-treatment of mouldy rot.** Agric. Bull. Federated Malay States **8**: 113–116. 1921.—Mouldy rot is a disease of the tapped surface of the Para rubber tree, *Hevea brasiliensis*, one of the causes of which is a fungus assigned to the genus *Sphaeronema*. Cleanliness of tapping knives and disinfectant paints appear to check it.—*I. H. Burkill.*

440. Porter, R. H. **A two-minute treatment of seed potatoes.** Potato Mag. **3**[9]: 8–9. *2 fig. 1921.*

441. Salmon, E. S., and H. Wormald. **Prevention of "bunt" in wheat.** Jour. Ministry Agric. Great Britain 27: 1013–1021. 1921.—Field tests were conducted during 1919 and 1920 on the value of copper sulphate and formalin seed treatments for the control of "bunt," *Tilletia tritici*, in wheat. The chief solutions used were copper sulphate 1 and 2½ per cent and formalin 1: 320 and 1: 240. These were sprinkled over the grain at the rate of 1 gallon to 2 bushels of grain, after which the copper sulphate treated grain was spread out at once to dry and the formalin treated grain was placed in a heap and covered with sacks for 4 hours, and finally spread out to dry.—The percentage of germination of the treated grain was only slightly reduced when the above treatments were used, but in a few preliminary tests with stronger solutions of copper sulphate, up to 5 per cent, the injury to germination was considerable. Therefore the practice which is common in Britain of using 10 per cent copper sulphate solution for treatment should be discouraged.—The formalin treatments gave complete control of "bunt" whereas the copper sulphate treatments were much less effective. Treatment with formalin 1:320 is recommended.—*M. B. McKay.*

442. Sosa, H. A. **Como evitar las enfermedades en las plantas.** [How to avoid plant diseases.] Defensa Agric. [Uruguay] 1: 141–144. 1920.

443. Sullivan, K. C. **Plant inspection in Missouri.** Missouri Agric. Exp. Sta. Circ. 101. *16 p.* 1920.

444. Thomas, R. C. **Brown rot of peaches and its control.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 26–30. 1921.—Brown rot attacks plums and peaches, beginning in May and continuing through the summer. Control measures are considered under 2 heads, (1) sanitary precautions and (2) protective sprays. Lime-sulphur-glue spray was found to be very satisfactory for the control of brown rot and other mid-season peach diseases. At the close of the article a spray calendar for peach is given.—*R. C. Thomas.*

445. Trujillo, Augustin. **El Oidium y modo de combatirlo.** [Oidium and the method of combating it.] Defensa Agric. [Uruguay] 1: 120–121. 1920.—Powdery mildew of the grape.—*John A. Stevenson.*

446. Trujillo, Augustin. **El Oidium y modo de combatirlo.** [Treatment for Oidium.] Defensa Agric. [Uruguay] 1: 141. 1920.—The writer advocates the use of sulphur or sulphur compounds for powdery mildew (*Oidium*) of the grape.—*John A. Stevenson.*

447. Vermorel, V., et E. Dantony. **La defense de nos jardins contre les insectes et les parasites.** *13 × 22 cm., 232 p., 12 pl (colored).* Progres Agricole et Viticole: Villefranche-Montpellier, 1919 (?).—Small handbook for French growers, containing descriptions and illustrations of the principal insect pests and fungous diseases, with chapters on disease and insect control.—*D. Reddick.*

448. Voglino, P., e V. Bongini. **Consigli pratici per il mese di Febbraio.** [Control measures recommended for the month of February.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 1919[2]: 1. 1919.—The brown spot of cherry caused by *Clasterosporium carpophilum*, which was rather prevalent last year, may be checked by the application of 3 per cent copper-lime paste on the trunk and branches. The same treatment may also be given for gummosis of peach, apricot, and almond. Use of flowers of sulphur will prevent the development of fungous diseases on hot-house plants.—*Edith K. Cash.*

449. Voglino, P., e V. Bongini. **Consigli pratici per il mese di Gennaio.** [Control measures recommended for the month of January.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 1919[1]: 1–2. 1919.—Spraying peach trees with a 5 per cent solution of ferrous sulphate or 3 per cent copper sulphate and lime is advised as a preventive against leaf curl (*Exoascus deformans*) and mildew (*Sphaerotheca pannosa*). Stored tubers should be spread out and aired to guard against molds.—*Edith K. Cash.*

MISCELLANEOUS (COGNATE RESEARCHES, TECHNIQUE, ETC.)

450. Anonymous. **Fäulniserreger in Rübenmieten.** [Producers of decay in beet pits.] Mitteil. Deutsch. Landw. Ges. **36**: 185. 1921.—This note calls attention to the discovery of *Botrytis cinerea* as the cause of decay in stored swedes.—*A. J. Pieters.*

451. Hoxie, F. J. **Treated lumber for insulating roofs of moist factories.** American Wood Preservers' Association: 1921.—Method is described of insulating a New England cotton-mill roof to prevent decay and sweating. Seven-eighths inch pine boards were treated in an open concrete tank (out-of-doors) for 20 hours in creosote at a temperature of 220°F.; 6 lbs. of creosote was absorbed per cubic foot. The boards were applied to the old roof without removing the slag or paper, on $\frac{7}{8}$ inch sleepers, leaving an air space between the slag and new roof. Upon the treated new surface was placed the usual 5-ply tar paper and slag. [Paper presented at 17th annual meeting American Wood Preservers' Association, Jan., 1921.]—*Walter H. Snell.*

452. Waldron, J. W., C. R. Hemenway, J. N. S. Williams, Wm. Searby, T. H. Petrie, J. K. Clarke, and H. P. Agee. **Report of the committee in charge of the experiment station.** Rept. Exp. Sta. Hawaii Sugar Planters' Assoc. **1920**: 1–4. 1920.—A discussion is presented of certain fungous and insect enemies of sugarcane, together with reports as to progress of the investigations concerning the improvement of sugarcane by seed selection, the possibilities of reducing the purity of the final molasses, and the condition of the soils of the various sugar plantations. The forestry situation as related to sugar production and the insect and disease enemies of forest trees are also considered.—*J. M. Westgate.*

453. Wildeman, E. de. **Sur les théories de la myrmécophylie. On the theories of myrmecophily.**] Compt. Rend. Acad. Sci. Paris **172**: 124–126. 1921.—This phenomenon is generally attributed to gall formation due to the activity of insects, but the author disagrees with this as a generalization universally applicable. He finds cases especially in *Acacia* in which the gall is apparently not to be attributed to insect activity. In some cases it has become hereditary. The relationship when insects are present seems to be more of a parasitism than a symbiosis.—*C. H. and W. K. Farr.*

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

Heber W. Youngken, *Editor*
E. N. Gathercoal, *Assistant Editor*

(See also in this issue Entries 15, 35, 47, 59, 70, 105, 574)

454. Anonymous. [Rev. of: Kraemer, H. **Scientific and applied pharmacognosy.** *2nd ed., xxviii + 741 p.* John Wiley and Sons: New York; Chapman and Hall: London, 1920.] Nature **106**: 531. 1920.

455. Bardier, E., et E. Martin-Sans. **Variabilité de la toxicité du gui suivant son hôte. [Variability of the toxicity of mistletoe according to its host.]** Compt. Rend. Soc. Biol. Paris **83**: 379–381. 1920.—Officinal aqueous preparations from mistletoe growing upon spruce, apple, and poplar, when tested by intravenous injection into dogs and rabbits, showed great differences in toxicity, that from the poplar being far more poisonous than the extracts from mistletoe growing upon apple or spruce.—*E. A. Bessey.*

456. Blair, T. S. **Habit indulgence in certain cactaceous plants among the Indians.** Jour. Amer. Med. Assoc. **76**: 1033–1034. 1921.—Legislation to prohibit the use of "peyote" is pending in the U. S. A. Congress. Commercial peyote includes various products of cactaceous plants having narcotic effects. Among these are the "mescal button,"—the fruits of *Anhalonium lewini*,—the use of which is spreading among the Indian tribes of the South-

west. Its evil effects are similar to those of the Oriental Indian Hemp (*Cannabis*). Unfortunately, the mescal buttons are regarded with superstitious reverence and are used in religious ceremonials.—*Wm. B. Day.*

457. Bohrisch, P. **Ueber Tupelostifte. [Concerning tupelo tents.]** Pharm. Zentralhalle **62**: 109–111. 1921.—The writer does not agree with Braun's statement, that tents made from tupelo wood, *Nyssa aquatica* L., are ineffective because they do not swell as readily as tents made from *Laminaria*. When the wood is pressed to from 1/4 to 1/5 of its diameter, it swells to about 3 times its thickness when placed in water.—*H. Engelhardt.*

458. Boulay, A. **Note sur les caractères et la composition de l'huile de Gillesiella congolana. [Character and composition of the oil of Gillesiella congolana.]** Bull. Sci. Pharm. **27**: 626–628. 1920.—The fruit of *Gillesiella congolana* contains about 51 per cent of a yellowish-brown, transparent oil which has a taste recalling that of oil of sweet almond. It has the sp. gr. 0.9159, a saponification value 192.5, and an iodine value 93.8. The combined fatty acids melt at 29°C., have a saponification value of 205.7, and the molecular weight 272.2. They consist of 35 per cent of solid and 65 per cent of liquid fatty acids. The former consist of erucic and palmitic acids, while the latter are composed of oleic acid with a small amount of linolenic acid. These constants do not quite agree with those given by Pieraerts, but the author believes that the discrepancy is due to the fact that the samples examined differed considerably in weight and in size.—*H. Engelhardt.*

459. Bouquet, J. **Documents sur la matière médicale indigene dans l'Afrique du Nord (Sud Tunisien.- Extrême-Sud Constantinois.—Maroc Occidental.) [Reports on the native medicinal plants of northern Africa (southern Tunis; southernmost Constantine; western Morocco).]** Bull. Sci. Pharm. **23**: 22–36, 73–84. 1921.—An exhaustive compilation of the various plants used for medicinal purposes in northeastern Africa.—*H. Engelhardt.*

460. Bridel, Marc. **Sur la conservation des préparations galéniques de gentiane obtenues avec une racine de gentiane séchée a l'air sans fermentation. [The stability of galenical preparations of gentian, obtained with an air-dried gentian without fermentation.]** Jour. Pharm. et Chimie **22**: 411–418. 1920.—Both in the powdered drug and in the alcoholic extract, which had been kept for 9 years, no loss in carbohydrates had occurred. The loss in these substances was, however, a very great one in liquid alcoholic preparations. The percentage of gentiopicrin was only slightly reduced in a tincture prepared with 95 per cent alcohol, but more so in other alcoholic preparations and especially in one prepared by extracting the drug with boiling alcohol. It had entirely disappeared from the powdered drug when the latter still contained an appreciable quantity of a glucoside hydrolyzable by emulsin, probably a cleavage product of gentiopicrin. A tincture of gentian prepared by maceration with 60 per cent alcohol contained no gentiopicrin from the time of its preparation, but contained a glucoside with a reducing factor almost equal to that of β ethylglucoside.—*H. Engelhardt.*

461. Delaunay, M. P. **Présence de la loroglossine dans plusieurs espèces d'Orchidées indigenes. [Presence of loroglossin in several species of native Orchideae.]** Jour. Pharm. et Chimie **23**: 265–272. 1921.—The glucoside loroglossin which was isolated from *Loroglossum hircinum* Rich. by Bourquelot and Bridel could also be isolated from *Orchis simia* Lam., *O. bifolia* L., *Cephalanthera grandifolia* Babingt., *Ophrys aranifera* Huds., and *O. apifera* Huds. The Orchideae which are closely related botanically by their morphological character are also closely related chemically.—*H. Engelhardt.*

462. Diedrichs, A., und B. Schmittmann. **Über indisches Curry-Pulver. [Indian curry powder.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel **40**: 361–364. 1920.—Chemical analyses.—*H. G. Barbour.*

463. Mackay, A. H. **The alkaloids of Senecio Jacobaea.** Nature **106**: 503. 1920.—Correction in earlier article (Nature **106**: 321. 1920). The plant has not been fatal to sheep as it has to cattle.—*O. A. Stevens.*

464. Maiden, J. H. **Plants which produce inflammation or irritation of the skin.** Agric. Gaz. New South Wales **32**: 206. 1921.—Evidence is meagre that "brigalow itch" is caused by brigalow, *Acacia harpophylla. Xanthium strumarium* and species of *Callitris* (pine) are said to cause dermatitis.—*L. R. Waldron.*

465. Maue, G. **Über die Inhaltsstoffe der Rhabarberblätter. [Content of rhubarb leaves.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel **40**: 345–350. 1920.—The leaves are the most valuable part of rhubarb as a vegetable. The only constituents responsible for various cases of poisoning are the acids known as emodin (frangulinic) and chrysophanic acids, which are bound to soluble oxalic acid and oxymethylanthrochinon.—*H. G. Barbour.*

466. Pieraerts, J. **Sur l'Héritiera littoralis Ait. [Concerning Heritiera littoralis Ait.]** Bull. Sci. Pharm. **23**: 15–22. *Pl. 2, fig. 4.* 1921.—Kola nuts are frequently adulterated with the seeds of *Heritiera littoralis,* a plant native to East Africa but also found in other tropical countries of the Old World. The plant is a large tree, its wood grayish-brown, is very suitable for building material, and its bark, which is rich in tannins, is used for tanning purposes. The fruit is an akene, the pericarp of which is colored light brown externally, has a ligneous consistency and a more or less spongy internal texture. The dorsal surface of the fruit is convex, keel-shaped, and is provided throughout its length with a very pronounced median relief, which terminates at the rostrum. The seed does not contain caffeine and theobromine. Volatile oil is present in the drug; also a fixed oil, the latter amounting to 10 times the quantity present in kola. The fixed oil, unlike that of the kola nut, gives Halphen's reaction.—*H. Engelhardt.*

467. Prescher, J., und R. Claus. **Zwei eigenartige Ersatzmittel. [Two peculiar substitutes.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel **40**: 208. 1920.—A microscopic and chemical analysis of substitutes for cinnamon powder and rice starch. The substitute for the latter consisted of potato starch with ballast, such as sand, chalk, etc.—*H. G. Barbour.*

PHYSIOLOGY

B. M. Duggar, *Editor*

Carroll W. Dodge, *Assistant Editor*

(See also in this issue Entries 105, 160, 226, 230, 280, 437, 460, 461, 540, 543, 546, 551, 552, 555, 556)

GENERAL

468. Lumière, Auguste. **Le mythe des symbiotes. [The symbiosis myth.]** *xi + 205 p., 50 fig.* Masson et Cie.: Paris, 1919.—The material brought together in this little book is intended to exhibit some of the diverse rôles of microorganisms in nature, and more particularly to indicate the limited extent to which such organisms occur in symbiotic association with higher forms, and the specific nature of such associations. The facts are collated with the view of combatting the fundamental ideas of Portier to the effect that "the bacteria are the only simple organisms, all higher organisms being of a double nature;" that is, such higher forms include bacteria within their protoplasts. The work involves brief discussions of such topics as the following: Symbiosis in plants, as in orchids; the conditions of occurrence and the nature of the saprophytic organisms found occasionally or normally in certain organs of higher animals; vitamines; mitochondria; and asepsis.—*B. M. Duggar.*

DIFFUSION, PERMEABILITY

469. Anonymous. [Rev. of: Findlay, Alexander. **Osmotic pressure.** *2nd ed., xi + 116 p., 10 fig.* Longmans Green & Co.: London.] Sci. Prog. [London] 14: 158–159. 1919.

470. Buscalioni, Luigi. **Nuove osservazioni sulle cellule artificiali.** [**New observations on artificial cells** (conclusion).] Malpighia 28: 489–544. *Pl. 3, fig. 1–2.* 1920.—Experiments of the author have confirmed previous discoveries and added new data in regard to artificial cells, in which certain of the structures and physiological processes of living cells have been reproduced. Appended to the article is an extensive bibliography (pages 521–540) annotated by the author.—*Edith K. Cash.*

471. Dixon, H. H., and T. G. Mason. **A cryoscopic method for the estimation of sucrose.** Notes Bot. School Trinity Coll. Dublin 3: 83–89. 1920.—Since the depression of the freezing point caused by a given quantity of sucrose in a given volume of water is approximately doubled after inversion, the sucrose content of a solution can be determined by 2 cryoscopic observations,— one before and the other after inversion. No preliminary treatment for the removal of gums, etc., is necessary. Such treatment would be necessary for both polarimetric and copper methods. By using the thermo-electric method of cryoscopy a very small amount of plant sap (2½ cc.) is sufficient for a determination. The probable error with this method is a little greater than with Fehling's solution.—*G. B. Rigg.*

472. Mason, T. G. **On some factors affecting the concentration of electrolytes in the leaf-sap of Syringa vulgaris.** Notes Bot. School Trinity Coll. Dublin 3: 67–82. 1920.—The determination of the concentration of electrolytes in leaf-sap by conductivity observations was found unsatisfactory unless allowance was made for the viscosity of the sap. To make this correction, the conductivity of the sap was determined, then $\frac{N}{10}$ KCl was dissolved in it and the conductivity again determined. Then the conductivity of $\frac{N}{10}$ KCl in aqueous solution was determined. By comparing the value obtained by the last observation with the difference between those obtained by the first 2 the effects due to viscosity were determined.—The osmotic pressure of the cell sap is frequently mainly due to electrolytes, but the presence of solutes that are neither electrolytes nor sugars may play a part. A tendency was found for the content of electrolytes to vary inversely with that of the non-electrolytes. It is suggested that these fluctuations are associated with the rate of carbon assimilation, which determines the rate at which electrolytes are removed from solution in metabolism.—*G. B. Rigg.*

WATER RELATIONS

473. Bouyoucos, George J., and M. M. McCool. **Measurement of the amount of water that seeds cause to become unfree and their water soluble material.** Jour. Agric. Res. 20: 587–593. 1921.—The amount of unfree water, consisting of (a) capillary and adsorbed, and (b) combined (water of hydration and water of solid solution), was determined by the type of dilatometer used in a previous study of soils (see Bot. Absts. 9, Entry 535). Fourteen different kinds of seeds were used. The amount of water that seeds cause to become unfree is very large. Repeated freezing and thawing tend to diminish considerably the amount of unfree water, especially in some seeds. Dry seeds contain a large amount of water-soluble matter as is evidenced by the high freezing point depression.—*Evelyn I. Fernald.*

474. Hill, T. G. **The water economy of maritime plants.** Sci. Prog. [London] 14: 60–80. 1919.—The author carried out a series of experiments with halophytic plants, particularly with such forms as *Salicornia* and *Suaeda*, on the coast of Brittany, supplemented by work in the laboratory. The investigations were concerned primarily with (1) osmotic relations, (2) transpiration, and (3) absorption.—It was found that the osmotic power of the cell sap of the root hairs can be adjusted to the salt content of the soil. Transpiration was found to be remarkably high and variable for the plants in question, and in all cases it was greater

than for a typical mesophyte. Likewise the loss of water from succulent plants was considerably in excess of that from certain specified mesophytes. Experiments in which the aerial parts were immersed showed that the plants could absorb water, the amount taken up varying with the concentration of the salt solution, and the length of time they were submerged. Absorption was more rapid when the plants were immersed in fresh water than in sea-water. Experiments showed also that the aqueous vapor of the atmosphere could be utilized.—*L. L. Harter.*

475. Sahasrabuddhe, D. L. **A preliminary note on the effect of waterings on the amount of acids secreted by the gramplant** [Cicer Arietinum]. Agric. Jour. India **15**: 636–639. 1920.—In previous work (Agric. Res. Inst. Pusa Bull. 45. 1914) it was found that the gramplant was continually producing acid during its period of growth; the acids were found to be malic and oxalic. Glandular hairs which are found in large proportion on the ovaries are acid producing. Experiments in pots, recorded in this paper, show that the greater the amount of watering the greater the acidity of the plant.—*J. J. Skinner.*

MINERAL NUTRIENTS

476. Breazeale, J. F., and Lyman J. Briggs. **Concentration of potassium in orthoclase solutions not a measure of its availability to wheat seedlings.** Jour. Agric. Res. **20**: 615–621. 1921.—The orthoclase used was obtained near Riverside, California. It contained 12.5 per cent potassium oxide. Aqueous extracts contained 2–9 parts per million soluble potassium. Experiments with wheat seedlings showed that the soluble potassium in aqueous solution derived from finely ground orthoclase is not absorbed to a measurable degree. The availability of potassium is not increased by addition of calcium carbonate or sulphate, carbon dioxide, or by boiling, but it is increased by oxidizing the solute with hydrochloric or nitric acid. The action of the acids is to break down the complex solute molecule.—*D. Reddick.*

477. Buckner, G. Davis. **Comparative utilization of the mineral constituents in the cotyledons of bean seedlings grown in soil and in distilled water.** Jour. Agric. Res. **20**: 875–880. 1921.—A notably larger amount of reserve material was translocated from the cotyledons when the beans were grown in soil than when grown in distilled water. In either case a smaller proportion of calcium is translocated than of phosphorus or of magnesium.—*D. Reddick.*

478. Davis, A. R. **The variability of plants grown in water cultures.** Soil Sci. **11**: 1–32. *Fig. 1–12.* 1921.—The variability of Sonora wheat grown 5 weeks in 33 replicate water culture solutions and 33 days in 50 replicate water culture solutions showed a range of 20 per cent on either side of the mean for culture weights and about 50 per cent when individual cultures were considered. Chance selections of duplicate cultures in the first series showed means varying from 1.82 to 2.55 gm.—*W. J. Robbins.*

479. Espino, Rafael B. **Some aspects of the salt requirements of young rice plants.** Philippine Jour. Sci. **16**: 455–523. *Pl. 1, fig. 1–9.* 1920.—These studies deal with the mineral nutrition of lowland rice plants for the phase of their development represented by the 3-week period following germination. The experiments were carried out in spring and summer in a Baltimore greenhouse. The best results were obtained by the use of a 4-salt solution, monopotassium phosphate, calcium nitrate, magnesium sulphate, and ammonium sulphate with trace of ferric phosphate.—*Albert R. Sweetser.*

480. Jones, Linus H., and John W. Shive. **The influence of iron in the forms of ferric phosphate and ferrous sulfate upon the growth of wheat in a nutrient solution.** Soil Sci. **11**: 93–99. *Pl. 1, fig. 1.* 1921.—The growth of wheat in water cultures containing mineral salts, to which iron phosphate or iron sulphate containing equivalent amounts of iron were added, indicates that iron sulphate is a more available source of iron for wheat than iron phosphate.—*W. J. Robbins.*

481. Lagatu, H. **Sur le rôle respectif des trois bases: potasse, chaux, magnésie, dans les plantes cultivées.** [On the respective rôles of the three bases: potassium, calcium, and magnesium, in cultivated plants.] Compt. Rend. Acad. Sci. Paris **172**: 129–132. 1921.—These bases are compared as to the amounts required by various agricultural plants and a diagram is constructed comparing the plants in these respects.—*C. H. Farr.*

482. Lesage, Pierre. **Plantes salées et période des anomalies.** [Plants grown in salty solutions and the degree of their modification.] Compt. Rend. Acad. Sci. Paris **172**: 82–84. 1921.—*Lepidium sativum* was grown for 10 successive seasons in solutions containing high concentrations of salt and also in solutions of normal concentration. A comparison was made of the height of the plants and of the size and weight of the seeds. Plants grown in salt water are not so tall as those grown in fresh water, unless seeds from plants which grew in salt water are used. In the latter case the plants produced from these seeds are taller if grown in salt water than if grown in fresh water. This difference does not hold in the case of seed size and weight, in which cases the seeds produced on plants growing in salt water are always somewhat smaller and lighter than those grown in fresh water.—*C. H. Farr.*

483. Nicolas, G. **Contribution à l'étude du mécanisme de l'action fertilisante du soufre.** [A study of the rôle of sulphur.] Compt. Rend. Acad. Sci. Paris **172**: 85–87. 1921.—Flowers of sulphur were added to the soil. Beans grown in soil containing such sulphur showed an increase in the total weight of the seeds produced and in the weight of individual seeds. Very little if any starch was found stored in any part of the plant if grown without sulphur or on soil containing 100 or 300 kg. of sulphur per hectare. But abundant starch was present in both the stem and roots when plants were grown on soil containing 200 kg. of sulphur. The same relation held for peas, except that the optimum was at 300 kg. Sweet peas and lupines were also studied. The author agrees with Maze and Demolon that sulphur is necessary in chlorophyll formation.—*C. H. Farr.*

484. Serra, Aurelio. **Applicazione dei metodi microcristallografici al riconoscimento degli elementi minerali contenuti nei vegetali.** [Application of microcrystallographic methods to the determination of mineral elements in plants.] Malpighia **28**: 558–560. 1920.—The author describes his method of preparing plant tissues for determining mineral crystals contained in them, and also notes the possible value of this line of investigation in the study of the soil requirements of plants.—*Edith K. Cash.*

485. Serra, Aurelio. **La cristallizzazione negli organi vegetali.** [Crystallization in plant organs.] Malpighia **28**: 555–557. 1920.—From the examination of tissues of various plants (*Ricinus, Oxalis, Citrus,* etc.) the conclusion was reached that crystallization occurs most frequently in aerial portions; and that it is furthered by processes of osmosis and assimilation and the evaporation caused by temperature and ventilation— all of the influences which tend to concentrate the solution in which crystalline molecules are deposited.—*Edith K. Cash.*

486. Trelease, Sam F. **The growth of rice as related to the proportions of fertilizer salts added to soil cultures.** Philippine Jour. Sci. **16**: 603–627. *Fig. 1–5.* 1920.—The present study deals with the growth of rice plants in soil cultures to which the 3 elements, phosphorus, nitrogen, and potassium, were added in various proportions.—*Albert R. Sweetser.*

487. Willaman, J. J. **Comparative salt absorption.** [Rev. of: Stiles, W., and F. Kidd. (1) **The influence of external concentration on the position of the equilibrium attained in the intake of salts by plant cells.** Proc. Roy. Soc. London B **90**: 448–470. 1919 (see Bot. Absts. 5, Entry 864); (2) **The comparative rate of absorption of various salts by plant tissue.** Proc. Roy. Soc. London B **90**: 487–504. 1919 (see Bot. Absts. 5, Entry 851); (3) Stiles, W., and W. Jörgensen. **On the relation of plasmolysis to the shrinkage of plant tissue in salt solutions.** New Phytol. **18**: 40–50. 1919 (see Bot. Absts. 3, Entry 434).] Bot. Gaz. **69**: 190–191. 1920.

488. Wirthle, F., und K. Amberger. **Über Weinhefe und deren Kupfergehalt.** [Copper content of dregs of wine.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel **40**: 365–366. 1920.

PHOTOSYNTHESIS

489. Dixon, H. H., and H. H. Poole. **Photosynthesis and the electronic theory.** Notes Bot. School Trinity Coll. Dublin **3**: 90–104. 1920.—Negative electrons seem to be entirely responsible for the absorption of radiant energy from the ether. It is by this means that chlorophyll renders carbon dioxide and water reactive in the presence of light. The view that light energy becomes available for photosynthesis through the intermediary of the electrons is in accordance with sound reasoning and is verified by experiment.—The wave lengths that are effective in displacing the electrons of chlorophyll as indicated by its sensitizing action on the photographic plate, are the same as those that are effective in photosynthesis. Photosynthesis is apparently caused by light, the frequency of which is too low to effect the expulsion of the electrons from the chlorophyll molecule.—It seems that the atomic groups of leaf pigment enter into the reactions of photosynthesis and participate in the combinations and decompositions that ultimately lead to the formation of carbohydrates and the evolution of oxygen. Theories of photosynthesis, then, which assume that the chlorophyll itself enters into the reactions, are to be preferred to those suggestions which suppose that the reaction is accomplished externally to the chlorophyll by means of the energy absorbed and transformed by the latter.—*G. B. Rigg.*

490. Mazé, P. **Sur le mécanisme chimique de l'assimilation du gaz carbonique par les plantes vertes.** [On the chemical mechanism of the assimilation of carbon dioxide by green plants.] Compt. Rend. Acad. Sci. Paris **172**: 173–175. 1921.—The author attributes to hydroxylamine a rôle of primary importance in the synthesis of compounds from which carbohydrates are produced. He suggests the following reactions as a possible explanation of the process of photosynthesis: $NH_2OH + CO_2 = CO_2NH_2OH$ or $CO_3H_2NH_2OH$, $2(CO_2NH_2OH) = CH_2OH + CHO + HNO_2$, or $2(CO_3H_2NH_2OH) = CH_2OH + CHO + 2HNO_2 + 2H_2O$, $HNO_2 + H_2O = NH_2OH + O_2$.—*C. H. Farr.*

METABOLISM (GENERAL)

491. Amberger, C. **Über die Zusammensetzung des Rüböls.** [Composition of rapeseed oil.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel **40**: 192–201. 1920.

492. Barlot. **Sur un nouveau réactif des Lactaires et des Russules à saveur âcre.** [A new reaction for Lactarias and Russulas having a bitter taste.] Compt. Rend. Acad. Sci. Paris **172**: 87–89. 1921.—Color reactions are given with methyl chloroantimoniate. They are found to be diagnostic of certain species.—*C. H. Farr.*

493. Bau, A. **Die Bestimmung der Oxalsäure in Tee, Kaffee, Marmeladen, Gemüsen und Brot.** [Oxalic acid determination in tea, coffee, marmalade, vegetables, and bread.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel **40**: 50–66. 1920.

494. Blunck, G. **Quantitative Bestimmung physikalisch-chemischer Eigenschaften mikroskopisch-kleiner Mengen.** [Quantitative determination of the physical chemical characters of microscopic masses.] Zeitschr. Wiss. Mikrosk. **37**: 138–140. 1920.

495. Bömer, A., und J. Baumann. **Beiträge zur Kenntnis der Glyceride der Fette und Öle. IX. Die Glyceride des Cocosfettes.** [Glycerides of cocoanut fat.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel **40**: 97–151. 1920.—Considerable caprylic acid was found but no caproic or caprinic. Besides oleic acid there are small amounts of palmitic and stearic acids. The principal glycerides of the saturated fatty acids of cocoanut fat consist of myristin compounds.—*H. G. Barbour.*

496. Linossier, G. **Les vitamines et les champignons. [Vitamines and fungi.]** Compt. Rend. Soc. Biol. **83**: 346–349. 1920.—Certain fungi, *Oidium lactis*, *Aspergillus niger*, and *Penicillium glaucum*, are able to grow in pure culture in media lacking vitamines, but containing the necessary mineral nutrients, an ammonium salt, and glucose. Only on greatly reducing the nutrients does the 1st and sometimes the 2nd show feebler growth as compared with similar dilute solutions to which has been added a drop or so of sap or orange juice. Other fungi, like beer yeast and *Mycoderma vini*, easily show a marked difference when the vitamines are added. The fungi of the 1st group excrete into the culture media vitamines which stimulate the growth when added to the cultures of the fungi of the 2nd group. Yeast with vitamines exhausted all sugar of the medium in 11 days, without vitamines in 27 days. The weight of the fungus was respectively 10 and 6 mg. In another case in equal lengths of time the amount of sugar consumed was 1.6 and 1.16 gm. and the weight of fungus 16 and 8 mg., respectively for cultures with and without added vitamines.—*E. A. Bessey.*

497. Mannich, C., und K. Lenz. **Über eine Methode zur polarimetrischen Bestimmung der Stärke in Calciumchloridlösung. [Polarimetric determination of starch in $CaCl_2$ solution.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel **40**: 1–11. 1920.

498. Mitra, S. K. **Seasonal changes and translocation of carbohydrate materials in fruit spurs and two-year-old seedlings of apple.** Ohio Jour. Sci. **21**: 89–103. 1921.—Analyses for glucose, maltose, sucrose, total sugars, and readily hydrolyzed polysaccharides (called starch), as well as determinations of hydrogen-ion concentration, were made on samples of 1 year old stems, 2 year old stems, and roots of apple seedlings, and on apple spurs. The samples were collected twice a month during a year. No distinction is indicated between non-bearing spurs and spurs bearing fruit. The data are given in terms of dry weight. A correlation is pointed out between carbohydrate changes and hydrogen-ion concentration as this is known to favor the action of diastase or maltase.—*H. D. Hooker, Jr.*

499. Plahl, Lme. W. **Zum Nachweis der Oxalate in Pflanzengeweben. [Identification of oxalates in plant tissues.]** Zeitschr. Wiss. Mikrosk. **37**: 130–135. 1920.—The method depends on precipitation with $AgNO_3$ in the presence of HNO_3, other organic acids remaining in solution.—*H. G. Barbour.*

500. Sauvageau, C. **Sur la membrane de quelques algues floridées et sur la gélation de l'hydrosol gélosique. [On the membrane of certain red algae and the gelation of the gelatinous hydrosol.]** Compt. Rend. Acad. Sci. Paris **171**: 606–609. 1920.—Two types of indigenous red algae are used commercially as sources of agar and similar substances. The *Chondrus* type has an envelope of pecto-cellulose, the pectic portion upon gelation yielding the mucilage. The *Gelidium* type contains in addition a substance staining violet in iodine to which the name amyloid is applied. The changes taking place in this amyloid during cooking and boiling are described. This substance is found in species of *Gelidium*, *Gracilaria*, *Laurencia*, *Cystoclonium*, *Pterocladia*, *Ahnfeldia*, and *Porphyra*.—*C. H. Farr.*

METABOLISM (NITROGEN RELATIONS)

501. Guggenheim, M. **Die biogenen Amine und ihre Bedeutung für die Physiologie und Pathologie des pflanzlichen und tierischen Stoffwechsels. [The biogenous amines and their significance for the physiology and pathology of plant and animal metabolism.]** Monographien aus dem Gesamtgebiet der Physiologie der Pflanzen und der Tiere **3**: 1–376. Julius Springer: Berlin, 1920.—The point of view of the author is somewhat indicated by the fact that he recognizes the term 'biogenous amines' to represent no definitive physiological or chemical group, this name being considered preferable, however, to proteinogenous amines—since the latter implies a direct and invariable relation to the proteins. After a preliminary general account the author gives brief characterizations of the various larger groups. The substances included are treated under 9 topical headings, as follows: Alkylamines (methylamine, etc.), alkanol-

amines (cholin, etc.), neurin group, diamines (lysin, etc.), guanidin compounds, imidazole (histidin), betaines and α-amino acids, the phenylalkyl- and phenylalkanolamines (ephedrin, adrenalin, etc.), and indole thylamine. Under each substance there is a brief account of its discovery, occurrence and origin, composition, methods of preparation, and, so far as possible, its biological significance. The author regards the further study of these bodies as most important, offering such possibilities as rational explanations of vitamines, increased light on phenomena of virulence and immunity, and rapidly advancing knowledge in the field of internal secretions.—*B. M. Duggar.*

502. Mannich, C., und G. Wipperling. **Die Trennung und quantitative Bestimmung von Protein und Nichtprotein-Stickstoff durch Ultrafiltration. [Separation and quantitative determination of protein and non-protein nitrogen by ultrafiltration.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 12–20. 1920.—Beans, hops, carrots, potatoes, cottonseed, and wheat were analyzed. While the results varied considerably from parallel determinations by the accepted method, it is claimed that ultrafiltration will prove useful.—*H. G. Barbour.*

503. Strowd, W. H. **The forms of nitrogen in soy-bean nodules.** Soil Sci. 11: 123–130. 1921.—An examination of 100 gr. of soybean nodules failed to show the cyanide radical by a method sensitive to 0.01 mg. of hydrocyanic acid. Of the total nitrogen in nodules 30–40 per cent is water-soluble and 40–55 per cent soluble in 10 per cent salt or dilute alkali. About 3 per cent of the water-soluble nitrogen was protein or proteose. No globulin and only a small amount of albumin was found. Primary amino nitrogen formed 16 per cent of the protein-free water-soluble nitrogen, and amide nitrogen 19.3 per cent. Over 60 per cent of the total water-soluble nitrogen was precipitated by phospho-tungstic acid.—*W. J. Robbins.*

504. Woodard, J. **Tyrosin in fungi.** [Rev. of: Dodge, C. W. **Tyrosin in the fungi: chemistry and methods of studying the tyrosinase reaction.** Ann. Missouri Bot. Gard. 6: 71–92. 1919 (see Bot. Absts. 4, Entry 1446).] Bot. Gaz. 69: 191. 1920.

METABOLISM (ENZYMES, FERMENTATION)

505. Anonymous. [Rev. of: Effront, Jean. **Biochemical catalysts in life and industry. Proteolytic enzymes.** *xii + 752 p.* John Wiley & Sons: New York; Chapman & Hall: London, 1917.] Sci. Prog. [London] 14: 347–348. 1919.

506. Bridel, M., et R. Arnold. **Sur l'emploi de divers agents de précipitation dans la préparation de l'émulsine des amandes. [The use of different precipitation agents in the preparation of the emulsin of almonds.]** Jour. Pharm. et Chimie 23: 161–168. 1921.—Emulsin of almonds is generally prepared by Hérissey's process, that is, macerating the almonds with water, removing the casein by means of acetic acid, and precipitating the ferment by strong alcohol. Thus a mixture of ferments is obtained which consists of emulsin proper or β glucosidase, lactase, gentiobiase, cellobiase, melibiase, manninobiase, β galactosides, and a small amount of invertin. When alcohol is replaced by methyl alcohol or acetone and when too long a contact of the precipitant with the ferments is avoided, a ferment is obtained which possesses practically all the properties of ordinary emulsin. Furthermore, when the ferment is allowed to remain in contact with the precipitation liquid for too long a time an emulsin is obtained which is devoid of certain other ferments.—*H. Engelhardt.*

507. Harter, L. L. **Amylase of Rhizopus tritici, with a consideration of its secretion and action.** Jour. Agric. Res. 20: 761–786. 1921.—A vigorous starch-splitting enzyme is secreted by *R. tritici*. The enzyme from old mycelium is less active than that from young. Storage of the dried mycelium for several months at from 9° to 35°C. does not lessen its power of digestion, but at 60° it becomes gradually less. The optimum temperature for the digestion of starch is about 45°C. The hydrolytic capacity is destroyed in 100 hours at 60°C. Glucose retards the hydrolysis of starch paste, although the quantity of glucose does not influence the results. With a constant amount of enzyme powder hydrolysis increases with the increase in volume

of the solution up to a certain point, and then decreases. An end point in the hydrolysis is not reached without altering the equilibrium of the system, as by changing the temperature and diluting the solution. If judged by the iodine test an end point was obtained, but a quantitative determination of the reducing sugars did not account for all of the starch. When the enzyme is in suspension some of it is removed by filtering through Whatman chemically-prepared filter paper. Using equal weights of enzyme powder it was found that mycelium grown at 9° hydrolyzed about 4 times as much starch in the same length of time as mycelium grown at 40°C. The enzyme power of mycelium grown at 29°C. was intermediate between the 2. At these 3 temperatures the best growth of the fungus was made at 29° and the poorest at 9°C. There is "quantitative regulation" of the enzyme. The hydrolyzing power of mycelium is much greater when starch alone is used as a source of carbon than when glucose alone, or in combination with starch, was employed. However, if grown on sweet potato bouillon, which contains both starch and sugars, a unit weight of the mycelium will hydrolyze more starch than when grown on any of the other combinations. The vigor of growth of the fungus was correlated with the hydrolytic power of the enzyme powder. The results seem to indicate that it is not so much the source of the carbohydrate which influences the quantitative production of the enzyme as it is the influence which it has on the growth of the fungus on which the secretion of the enzyme depends.—*L. M. Massey.*

508. Leoncini, G. **Di un'ossidasia vegetale agente sulla florizina. [An oxidase of vegetable origin acting upon phloridzin.]** Staz. Sperim. Agrarie Ital. 53: 138–145. 1920.—When wheat kernels are allowed to remain in a solution of phloridzin at a temperature of 15–20°C. these soon become surrounded by a zone of yellow liquid. This zone extends to include the whole solution if the seed are allowed to remain for a few hours longer. The same phenomenon takes place when the seed have previously been sterilized with a 2 per cent $CuSO_4$ solution, or with formaldehyde. The seed of various other Graminaceae were tried and found to give negative results. The flour of the *Triticum* seed also gave negative results, while the bran was found to give positive results. The action was stopped when the seed were heated to 100°C. for 5 minutes or if the seed were placed in a system from which all the oxygen had been removed by means of a mercury pump. Sterile apple pulp gave a similar result. In a solution of tyrosine, however, no change took place. Beet pulp acted on both solutions, although its oxidizing power upon phloridzin is greater than upon tyrosine. The author concludes from these findings that some plants contain an oxidase capable of oxidizing phloridzin to a yellow substance probably of a quinoid structure, a change which permits the assumption that phloridzin behaves as a true chromogen.—*A. Bonazzi.*

509. Mason, T. G. **On the inhibition of the invertase in the sap of Galanthus nivalis.** Notes Bot. School Trinity Coll. Dublin 3: 105–119. 1920.—Since the depression of the freezing point of a sucrose solution is approximately doubled by complete inversion of the sucrose, it seemed probable that an approximate estimate of the sucrose content of the sap of leaves could be obtained by observing the increase in the depression of the freezing point after storage at a suitable temperature. It was found, however, that other factors (one or more) present in extracted sap tended to limit the activity of the enzyme. Changes of a nature not yet understood (possibly H-ion concentration) occurring in extracted juice lead to a clumping of the colloids. It is suggested that the enzyme may be inactivated by adsorption on the coagulated colloids. The experiments performed suggest that in cases of sucrose storage in living leaves the activity of the enzyme tending to invert it is regulated by reversible precipitation of the colloid (anti-enzyme).—*G. B. Rigg.*

METABOLISM (RESPIRATION, AERATION)

510. Rockwell, G. E. **A study of the gaseous requirements for the growth of various bacteria.** Jour. Infect. Diseases 28: 352–356. *Fig. 1.* 1921.—The author finds that the growth of some bacteria ordinarily considered to be of the aerobic and of the facultative anaerobic group is in some way favored by CO_2. Strict anaerobes cannot use even traces of atmospheric oxygen.—*Selman A. Waksman.*

ORGANISM AS A WHOLE

511. Beau, Clovis. **Sur le rôle trophique des endophytes d'Orchidées. [The nutritive rôle of endophytes of orchids.]** Compt. Rend. Acad. Sci. Paris 171: 675–677. 1920.—The small amount of food stored in the very minute seeds of orchids indicates that the mycelium of the endophyte supplies necessary foods from the surrounding medium at early stages of development. Experiments were performed with germinating orchid seed in Petri dishes. A block of nutritive gelatin was introduced and the culture infected with the endophytic mycorhiza. The hyphae were positively chemotropic towards gelatin and a connection is soon established by the hyphae between the gelatin and the seed. If these hyphae are destroyed the seed cease developing even though other hyphae may connect the seeds with distilled water. This may explain why some orchids may even reach the blooming stage in an aetiolated condition with little or no chlorophyll or light.—*C. H. Farr.*

512. Church, A. H. **The building of an autotrophic flagellate.** Bot. Mem. [Oxford] 1. *27 p.* 1919.—The author discusses the evolution of an autotrophic flagellate of pelagic plankton comparable with that from which the ancestral forms of the Phaeophyceae may have been derived. Evolution is considered and briefly discussed with reference to the following factors: Ionic relations, the external source of energy, photosynthesis, proteid-synthesis, balance of carbohydrate synthesis and proteid synthesis, growth, day and night, surface-tension, contractibility, differentiation of plasmatic tracts, polarity, the flagellum, binary fission, failure and death, holozoic nutrition, flagellar nutrition, plasmogamy and the origin of sexual fusion, differentiation of flagella, comparative dimensions, encystment, and formation of the cell wall.—*J. S. Cooley.*

513. Jones, H. A. **Physiological study of maple seeds.** Bot. Gaz. 69: 127–152. *2 fig.* 1920.—This is a study of the viability of the seed of the sugar maple (*Acer saccharum*) and the river maple (*Acer saccharinum*). The sugar maple seed mature in the fall, contain much fat and protein but little carbohydrate, and pass through a period of after-ripening before germination. The river maple seed mature in the spring, contain much starch but little fat and protein, and must germinate almost at once if at all.—The seed of the river maple lose their viability when the water content is reduced to 30–34 per cent. Temperature plays but little part in determining the critical point of water loss. The seed may be kept in a vigorous viable condition for a considerable time if stored over water at O°C. Respiratory activity in the desiccating seed at 25°C. first decreases slightly, then rises to a maximum, then gradually falls to zero as desiccation progresses. After a slight initial increase, catalase activity gradually decreases in the desiccating seed, but it increases enormously during the early stages of germination. A gradual decrease in peroxidase activity accompanies desiccation.—Sugar maple seed after-ripen best at temperatures near 5°C., with a good supply of oxygen and moisture, and show at that time a considerable increase in free-reducing sugars. Catalase activity increases greatly with after-ripening and germination, and there is also a slight increase in peroxidase activity. The hypocotyl as well as the entire embryo has a distinct alkaline reaction in both dormant and after-ripened seed. Fully after-ripened seed will remain in this condition for a long time if kept moist at—5°C.—*H. C. Cowles.*

514. Shull, C. A. **Susceptibility gradients.** [Rev. of: Child, C. M. (1) **Axial susceptibility gradients in algae.** Bot. Gaz. **62**: 89–114. 1916; (2) **Further observations on axial susceptibility gradients in algae.** Biol. Bull. **31**: 419–440. 1916; (3) **Susceptibility gradients in the hairs of certain marine algae.** Biol. Bull. **32**: 75–92. 1917; (4) **Experimental alteration of the axial gradient in the alga Griffithsia Bornetiana.** Biol. Bull. **32**: 213–233. 1917; (5) **Demonstration of the axial gradients by means of potassium permanganate.** Biol. Bull. **36**:133–147. 1919.] Bot. Gaz. 69: 187–188. 1920.

515. Walker, Leva B. **Biology and culture of the higher fungi.** [Rev. of: Boyer, G. **Études sur la biologie et la culture des champignons supérieurs.** *116 p., 4 pl., 20 fig.* Bordeaux, 1918 (see Bot. Absts. 5, Entry 1931).] Bot. Gaz. 69: 188–189. 1920.

GROWTH, DEVELOPMENT, REPRODUCTION

516. Crocker, William. **Conditions affecting flower development.** [Rev. of: (1) Klebs, George. **Ueber die Blütenbildung von Sempervivum. (Flower formation in Sempervivum.)** Flora **11–12**: 128–151. *5 fig.* 1918 (see Bot. Absts. 2, Entry 601); (2) Fischer, H. **Zur Frage der Kohlensäure-Ernährung der Pflanzen. (Carbonic acid nutrition of plants.)** Gartenflora **65**: 232–237. 1916; (3) Kraus, E. J., and H. R. Kraybill. **Vegetation and reproduction with special reference to the tomato.** Oregon Agric. Exp. Sta. Bull. 149. *90 p.* 1918 (see Bot. Absts. 1, Entry 1402).] Bot. Gaz. **67**: 445–446. 1919.

517. Mitscherlich, E. A. **Ein Beitrag zum Gesetze des Pflanzenwachstums. [The law of plant growth.]** Fühling's Landw. Zeitg. **68**: 130–133. 1919.—The author calls attention to a general phenomenon of growth in organisms, viz., slow initial growth, a period of rapid growth, and a period of slow growth as maturity sets in.—He reports determinations of dry weight produced during the grand period of growth in cultures of peas and mustard. Determinations were made at quasi-definite stages of growth; for example, the appearance of the 1st tendril-bearing leaves, and of 4th pair of leaves (in peas). The stages of growth did not represent the same time interval in all cases.—Values closely approximating the observed were given by the equations,

$$\text{for peas, } \log.\left(1.345 - \sqrt[15]{y}\right) = .1286 - .24x;$$

$$\text{for mustard, } \log.\left(1.26 - \sqrt[15]{y}\right) = .1 - .4x;$$

in which y = the average dry weight of plants at the xth growth period. — *H. S. Reed.*

518. Mitscherlich, E. A. **Zum Gesetze des Pflanzenwachstums. [The laws of plant growth.]** Fühling's Landw. Zeitg. **68**: 419–426. 1919.—This is a rejoinder to Rippel's discussion and criticisms (see Bot. Absts. 9, Entry 519).—The rate of growth of organisms is expressed by the differential equation,

$$\frac{dy}{dx} = cy\ (A - y),$$

in which y = the mass of the plant at time x, A = the final (limiting) value of y, and c = a constant. Various methods of integration give equations which express the value of y for any positive value of x. Robertson's equation,

$$\log \frac{x}{A - x} = K\ (t - t_1),$$

gives, for small values of x, values which are larger than the observed, while Mitscherlich's equation,

$$\log\left(\sqrt[n]{A} - \sqrt[n]{y}\right) = \log \sqrt[n]{A} - c.x,$$

gives lower values. Somewhat better agreement may be obtained in the case of plant growth if the weight of the seed planted be deducted. Rippels' theory that during the first stage of growth there is some sort of a retarding factor is contradicted. The 2 equations are examined for their ability to express the growth of gourd fruits, *Vicia Faba* roots, peas, and mustard plants.—The somewhat polemical discussion concludes with the statement that Rippel's criticisms in no way invalidate Mitscherlich's previous statements.—*H. S. Reed.*

519. Rippel, A. **Die Wachstumkurve der Pflanzen und ihre mathematische Behandlung durch Robertson und Mitscherlich. [The growth curves of plants and their mathematical treatment according to Robertson and Mitscherlich.]** Fühling's Landw. Zeitg. **68**: 201–214. 1919.—This is a critical examination of the applicability of formulas proposed by Robertson and by Mitscherlich (see Bot. Absts. 9, Entry 517, 518) to the growth of plants. It contains citations to cognate studies, and deals with the rate of growth of root zones, of seedling

leaves, and of flower stalks; the evolution of CO_2 in alcoholic fermentation; and water absorption by plants. There is a discussion of the formula of autocatalysis presented by Robertson,

$$\log \frac{x}{A-x} = K(t - t_1),$$

where x = quantity of substance formed at time t, A = final (limiting) value of x, K is a constant of the reaction, and t_1 is the time at which $x = \frac{A}{2}$. Also, there is consideration of the formula presented by Mitscherlich,

$$\log\left(\sqrt[n]{A} - \sqrt[n]{y}\right) = \log \sqrt[n]{A} - c.\, x,$$

where y = amount of substance formed at stage x, A = final (limiting) value of y, and n = number of stages. The author concludes that Robertson's formula gives more nearly correct representation of physiological processes than that of Mitscherlich. He discusses sources of error of determinations and necessary precautions. The original should be consulted.—*H. S. Reed.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

520. Anonymous. [Rev. of: Loeb, Jaques. **Forced movements, tropisms, and animal conduct.** *209 p., 42 fig.* J. B. Lippincott & Co.: London and Philadelphia, 1918.] Sci. Prog. [London] **14**: 167–168. 1919.

521. Fyson, P. F., and K. Venkataraman. **Note on curvature of cut stems of Bryophyllum calycinum.** Jour. Indian Bot. **1**: 337–343. *Pl. 2.* 1920.—This paper is inspired by J. Loeb and is an answer to various papers by him on growth in *Bryophyllum calycinum.* [See Bot. Absts. 1, Entries 68, 273, 736; 2, Entries 181, 858, 859.] The authors conclude from experiments conducted in Madras on this plant: That curvature of horizontally supported stems is due to the weight of the stem, and not to the formation of geotropic hormones by any leaves that may remain attached; that root formation by stems bears no apparent relation to the presence or absence of leaves; that the formation of roots from the notches of leaves depends on moisture supply, and not on leaf position; that "neither the stem itself, not the opposite bud, nor the axillary bud, exert any absolute inhibition on the development of the marginal notches, and probably affect it very little"; that root pressure or a developing terminal bud exert no influence on the formation of roots from the notches of attached leaves; and finally that "our observations confirm those of Klebs on the effect of an excess of water on adventitious root formation."—*Winfield Dudgeon.*

522. Phillips, Thomas G. **Chemical and physical changes during geotropic response.** Bot. Gaz. **69**: 168–178. 1920.—Definite moisture changes accompany geotropic bending in corn nodes. During the early stages of bending there is a greater percentage of moisture in the concave flank. When the process has developed, the percentage of water is greater in the convex flank. Although the titratable acidity is greater in the convex flank, the differences are very slight. The results on hydrogen-ion concentration, although uniform in direction, are not numerous enough to serve as a basis for conclusions. It is impossible, with the data obtained, to correlate the geotropic bending of etiolated *Vicia Faba* shoots with differences in moisture, titratable acidity, hydrogen-ion concentration, catalase activity, or the distribution of sugars and nitrogen-containing substances.—*Thomas G. Phillips.*

523. Ricome, H. **L'orientation des rameaux dans l'espace.** [**The orientation of stems.**] Compt. Rend. Acad. Sci. Paris **171**: 734–735. 1920.—This is an addition to a recent article in an earlier number of the same volume in which the author attributes the weight which influences negatve geotropism to the distribution of water in the plant. [See also Bot. Absts. 8, Entry 663.]—*C. H. Farr.*

GERMINATION, RENEWAL OF ACTIVITY

524. Welton, F. A. **Longevity of seeds.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 18–24. 1921.—Brief reference is made to work done by Vilmorin, Haberlandt, and Sifton. Factors affecting the longevity of seed are discussed and reference is made to hard seed. The report in tabular form shows the per cent of viability of the seed of cereals, other grasses, and a few vegetables grown on the station farm at Wooster, Ohio, extending over a period of 12 years.—*R. C. Thomas.*

TEMPERATURE RELATIONS

525. Walster, H. L. **Formative effect of high and low temperatures upon the growth of barley: A chemical correlation.** Bot. Gaz. 69: 97–126. *18 fig.* 1920.—The usual view that the optimum germination temperature is that which most quickly permits the emergence of the radicle and plumule is not accepted, except for the germination function taken by itself. A high temperature and a high nitrogen supply at the time of germination so shift the equilibrium toward excessive vegetation as to prevent the normal tendency toward reproduction. The tendency toward excessive vegetation inaugurated by an excess of nitrate nitrogen accompanying germination and early development at high temperatures cannot be counteracted by the addition of phosphorus or potassium salts. A chemical analysis of the leaf reveals (1) that "high heat supply + high nitrogen supply in nutrient solution = high soluble nitrogen in leaf + low soluble carbohydrate = excessive vegetation and little culm formation," and (2) that "low heat supply + high nitrogen supply in nutrient solution = low soluble nitrogen in leaf + high soluble carbohydrate = normal vegetation and normal culm formation."—*H. C. Cowles.*

RADIANT ENERGY RELATIONS

526. Wurmser, René. **L'action des radiations de différentes longuers d'onde sur l'assimilation chlorophyllienne. [The effect of rays of different wave length on chlorophyll assimilation.]** Compt. Rend. Acad. Sci. Paris 171: 820–822. 1920.—The work is carried out with a new method based on the principles outlined by Loeb and Osterhout. Phenolphthalein was used as an indicator, and experiments were performed with *Ulva lactuca* and *Rhodymenia palmata.* The rate of assimilation in the red, green, and blue respectively was found to be 100, 24, and 80 for *Ulva,* and 100, 50, and 18 for *Rhodymenia.* It thus appears that the red pigment of the Rhodophyceae makes possible the use of green light in photosynthesis.—*C. H. Farr.*

527. Wurmser, René. **L'action de la lumière sur la chlorophylle colloidale en présence de stabilisateurs. [The action of light upon colloidal chlorophyll in the presence of stabilizers.]** Compt. Rend. Soc. Biol. 83: 437–438. 1920.—While chlorophyll is destroyed by light very rapidly when in solution, yet in the plant it is destroyed slowly. By mixing a solution of chlorophyll prepared by the method of Willstätter and Stoll with various colloids this destructive action of light has been greatly retarded, a gelatin solution being the most effective of those tried (gelatin, egg albumin, gum arabic, and starch paste).—*E. A. Bessey.*

TOXIC AGENTS

528. Miège, E. **Action de la chloropicrine sur la faculté germinative des graines. [The effect of chloropicrine on the germinating ability of seeds.]** Compt. Rend. Acad. Sci. Paris 172: 170–173. 1921.—Chloropicrine is found to interfere with the germination of some seeds while not affecting others at ordinary concentrations. Flax is not affected at 15 cc. per cubic meter, but is affected at 50 cc. concentration. Legumes in general are resistant, whereas grasses are sensitive to the gas. About 15–20 cc. per cubic meter is recommended as an insecticide, being used for a period of 24 hours without much injury to any seed.—*C. H. Farr.*

529. Villedieu, M. et Mme. **De la non-toxicité du cuivre pour les moisissures en général et pour le mildou en particulier. [The non-toxicity of copper for molds in general and for mildews in particular.]** Compt. Rend. Acad. Sci. Paris 171: 737–739. 1920.—Most ordinary molds may be cultivated in 1, 2, 5, or 10 per cent solutions of cuproammonium citrate, a salt which is slightly acid, very soluble in water, and contains 15 per cent metallic copper. *Penicillium* lives well in nutritive agar saturated with this salt. The toxic action of copper sulphate is found to be due entirely to the free sulphuric acid produced in solution. *Phytophthora infestans* will grow in solutions of copper ammonium citrate up to a strength of at least 0.1 per cent.—*C. H. Farr.*

530. Wieler, A. **Rauchschaden bei Kokereien. [Smoke injury from coke ovens.]** Jahresber. Ver. Angew. Bot. 16: 64–76. 1918.—The author finds considerable injury from fumes of coke ovens within a radius of a kilometer, extent of injury varying with distance from ovens, direction from ovens, intervening barriers, etc. Different plants vary greatly with regard to their susceptibility to injury—legumes, roses, and potatoes suffering more than other crops. The character of the injury is very different from that of the acid injuries produced by sulphur fumes, and the writer does not believe that sulphur is responsible in this case. He indicates rather that some basic compounds of the anthracene-oil fraction and possibly ammonia are the toxic substances, although this phase needs further investigation. No method of prevention has been found.—*P. J. Anderson.*

ELECTRICITY AND MECHANICAL AGENTS

531. Peck, J. L. **Les différences de potential en biologie. [Differences of potential in biology.]** Compt. Rend. Soc. Biol. 83: 282–283. 1920.—A growing carrot plant removed from the soil and placed with its roots in water up to the middle showed a difference in potential between leaves and water of about 4 volts. Under the influence of ultra-violet rays this increased to 8 volts and became zero on adding to the water 10 drops of HNO_3 per 100 gm. water. Further experiments with animal tissues showed a difference in potential between muscles and blood, or between muscles and water, into which they were placed. These were increased by ultra-violet light or some toxins. The absorption of water by the muscles shows a close relation to the potential differences between the water and muscle.—*E. A. Bessey.*

SOIL SCIENCE

J. J. Skinner, *Editor*
F. M. Schertz, *Assistant Editor*

(See also in this issue Entries 11, 25, 27, 32, 34, 57, 100, 107, 112, 203, 208, 402, 437, 452, 480, 574)

532. Aiyer, A. R. Padmanabha, and D. V. Bal. **The chemical and biological aspect of Bhata soil of Chandkhuri experimental farm, Central Provinces.** Agric. Jour. India 15: 644–649. *Pl. 46–50.* 1920.—The Bhata or lateritic soils of Central Provinces were found to be poor on account of the large per cent of coarse material they contained and to a lack of phosphorus. The addition of phosphorus improved the soil for the growth of leguminous crops. The soil has good ammonifying and nitrifying powers. When cake was applied and inoculated with emulsion of a rich black cotton soil, good growth was secured.—*J. J. Skinner.*

533. Albrecht, W. A. **Bat guano and its fertilizing value.** Missouri Agric. Exp. Sta. Bull. 180. *15 p.* 1921.—Chemical analyses of bat guano and pot and field experiments with this material as a fertilizer are reported. The material, which is commonly found in caves in Missouri, is said to have considerable value as a fertilizer, its nitrogen content varying from 0.31 to 10.44 per cent, phosphoric acid 2.5 to 7.9 per cent, and potash 0.36 to 1.9 per cent. In ammonification tests fresh bat guano produced as much ammonia and more nitrates than

tankage but did not equal dried blood. In pot cultures bat guano gave better results than dried blood, tankage, or ammonium sulphate, and in field tests with oats it also proved superior to ammonium sulphate. Because of its relatively high nitrogen content and because of its light weight when dry it is recommended primarily for mixture with other fertilizers.—*L. J. Stadler.*

534. Baguley, A. **Building up the fertility of the soil.** Jour. Dept. Agric. Union of South Africa 1: 755–759. 1920.—A general discussion of improving soil fertility by means of humus, lime, and fertilizers.—*J. J. Skinner.*

535. Bouyoucos, George B. **A new classification of soil moisture.** Soil Sci. 11: 33–47. 1921.—On the basis of freezing point determination of soil of various types and water contents and determinations of the per cent of water which freezes in soils at different temperatures as determined by the use of the dilatometer, the soil water is classified as gravitational, free (water which freezes for the first time at a supercooling of −1.5°C.), capillary adsorbed (water which freezes at the supercooling of −4°C.), and combined water, which does not freeze even at −78°C. The capillary-adsorbed and combined water are called unfree.—*W. J. Robbins.*

536. Bouyoucos, George B. **The concentration of the soil solution around the soil particles.** Soil Sci. 11: 131–138. 1921.—The concentration of the soil solution in intimate contact with the surface of the soil particles is less than that of the mass of the soil solution. This is indicated (1) by the diminution of the freezing-point lowerings of soils by successive freezing and thawing; (2) by the liberation of unfree water from soils, by successive freezing and thawing; (3) by the abnormally greater increase in the freezing-point depression of soils as the moisture content decreases; and (4) the equality in the freezing-point lowering between the supernatant liquid and the soil which bathes it.—*W. J. Robbins.*

537. Davis, R. O. E. **Atmospheric nitrogen for fertilizer.** U. S. Dept. Agric. Yearbook 1919: 115–123. 1920.—The sources of natural nitrogen fertilizer supply are shown to be inadequate to meet the increased future demands. The desirability of a method of utilizing the atmospheric nitrogen was emphasized. A discussion of the practicality of 5 principal methods for conversion of atmospheric nitrogen into available fertilizer compounds showed that the Haber and the cyanamid processes were the only ones adapted to use in the U. S. A. at present.—*C. J. Shirk.*

538. Espe, Knute, and Lawrence E. Lindley. **Soil survey of Hamilton County, Iowa.** Advance Sheets Field Operations Bur. Soils, U. S. Dept. Agric. 1917: 5–30. *Fig. 1 and map (colored).* 1920.—Hamilton County is situated in the north central part of Iowa in a prairie region. The prevailing flat topography is intercepted by the precipitous slopes of Boone River and by morainic ridges. The general elevation is between 1,100 and 1,200 feet above sea level.—Drainage within the county as a whole is imperfect.—The mean annual precipitation is 34.55 inches. The normal growing season is 146 days.—Agriculture, which is the principal industry in Hamilton County, consists mainly in the production of corn, small grain, and hay combined with the raising and feeding of hogs and other live stock. Corn is the main crop.—The soils of the county are glacial in origin, in appearance they are predominantly dark. Large poorly drained areas occur. In great part the soils of the county are calcareous, alluvial soils are inextensive. Eroded strips bordering the stream valleys are characterized by light brown to gray surface soils. Such areas are for the most part forested and originally were all forested. Peat and muck occur in shallow and basin-like areas representing former ponds or lakes. Small areas of alkaline soils occur in the swales, ponds, or sloughs that have recently been drained. Corn is most susceptible to injury from the alkali. Drainage is the chief factor in correcting the alkaline condition.—Improved land constitutes 90–95 per cent of the County. The average size of farms is about 179 acres.—*F. B. Howe.*

539. Geib, W. J., Clarence Lounsbury, and Martin O. Tosterud. **Soil survey of Waupaca County, Wisconsin.** Advance Sheets Field Operations Bur. Soils, U. S. Dept. Agric.

1917: 5–50. *Fig. 1 and map (colored).* 1920.—Waupaca County is situated in the east central part of Wisconsin in a glaciated region. The topography varies from level to rolling or hilly, the ruling elevation of the county being 848 feet above sea level.—The county lies within the drainage basin of Wolf River. Numerous marsh areas and lakes are found in the county.—The mean annual precipitation is 31.62 inches, a large proportion of which occurs during the growing season, which averages 129 days. Early frosts are frequent on the marsh areas.—Agriculture consists in general farming, potatoes are an important crop on the sandy soils.—Large areas of unclaimed peat are found in the county. The depth of the peat varies from a shallow phase of 18 inches or less to 3 feet or more below the surface. Vegetation on peat consists of coarse marsh grasses, sedges, and sphagnum móss on open marshes, with willow, alder, some poplar, and tamarack in timbered tracts. Peat when reclaimed is adapted for potatoes, cabbage, celery, onions, and other garden truck. The Gloucester soils, one of the most important and extensive series in Waupaca County, especially in the western half, are derived through glacial action from crystalline rocks, and are mainly sandy in texture. The original forest growth was chiefly hardwoods, including maple, oak, birch, and some elm, with varying amounts of white and Norway pine. On the Gloucester sand the original timber growth consisted of scrubby oak and some white pine. The Kewaunee series and Superior series are partly lacustrine in origin; they are characterized by heavy clay subsoils. The original timber growth on these soils consisted of maple, oak, elm, hickory, some walnut, and varying amounts of pine. The Whitman series and the Poygan series are poorly drained upland soils which in their native state supported a growth of elm, ash, willow and alder, together with coarse grasses and other moisture-loving vegetation. Alluvial soils deposited as outwash plains consist of the Plainfield series and Merrimac series. Other alluvial soils such as the Genesee series and the Dunning series are subject to overflow where they occur adjacent to stream courses. The average size of farms is approximately 110 acres.—*F. B. Howe.*

540. GERLACH. **Die Kohlensäureernährung der Pflanzen und der Stalldünger. [Carbonic acid nutrition of plants and stable manure.]** Mitteil. Deutsch. Landw. Ges. 36: 147–150. 1921.—This is a general review of the controversy between BORNEMANN and LEMMERMAN in which the author brings forth data from previous experiments to show that Bornemann greatly overrated the effect of carbonic acid produced by the decay of stable and green manures. Gerlach finds that the carbonic acid thus produced has no effect on crop yields. [See also Bot. Absts. 8, Entry 12, 32.]—*A. J. Pieters.*

541. HARRISON, J. B., AND C. B. W. ANDERSON. **The genesis of a fertile soil.** West Indian Bull **18:** 77–98. 1920.—This paper comprises a study of the origin and development of the fertile sugar-cane soils of the island of Barbados, West Indies. Historical and analytical data are given, and the theory of the origin of the soils is discussed.—*J. S. Dash.*

542. HUDELSON, R. R. **Keeping soils productive.** Missouri Agric. Exp. Sta. Circ. 102. *24p.* 1921.—A brief popular discussion of the essentials in the maintenance of soil fertility.—*L. J. Stadler.*

543. HUDIG, J., EN W. STURM. **Het meten van waterstof-ionenconcentraties en bodenextracten en bodensuspensies. [Measurement of hydrogen-ion concentrations in soil extracts and soil suspensions.]** Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. 25: 85–127. 1919.—With the V-electrode no reliable measurements of soil extracts from sand-containing peat could be made, as the potential constantly changes. Through proper disinfection it was demonstrated that this could not be attributed to action of soil bacteria. A new electrode was constructed through which hydrogen could be conducted, the soil and liquid meanwhile being constantly in contact.—Hydrogen-ion concentration of a soil suspension depends upon (a) temperature, (b) quantity of liquid and soil, (c) time of penetration, (d) treatment, such as shaking, (e) addition of salts. The season also has an influence.—*J. C. Th. Uphof.*

544. Juritz, C. F. **Calcium cyanamide. Its agricultural use as a fertilizer.** Jour. Dept. Agric. Union of South Africa 1: 765–769. 1920.—A review of experiments with cyanamide is given. Under certain conditions of storage, dicyanamide is formed which is harmful to plants; its poisonous action is discussed. From the experiments cited the productive value of cyanamide is lower than that of nitrate of soda or sulphate of ammonia.—*J. J. Skinner.*

545. Kelley, W. P., and A. B. Cummins. **Chemical effect of salts on soils.** Soil Sci. 11: 139–159. *Fig. 1–7.* 1921.—A comparison was made between the analyses of the filtrate from a given soil after being treated with distilled water or with solutions of various salts. Chemically equivalent solutions of the chlorides, sulphates, and nitrates of a given base produced substantially equivalent chemical reactions in the soils studied. An exchange of bases took place with the result that a portion of the base of the added salt passed out of solution and a chemically equivalent amount of other bases was set free from the soil silicates; calcium is the base most easily replaced in the soils used. Considerable amounts of phosphate were precipitated by the soils. The reactions between neutral salts and soils are dependent upon the concentration and apparently obey the principle of mass action.—*W. J. Robbins.*

546. Lipman, J. G. **New Jersey's experience with fertilizers.** Potato Mag. 3[9]: 7, 28, 30. *1 fig.* 1921.

547. Lipman, J. G., A. W. Blair, W. H. Martin, and C. S. Beckwith. **Inoculated sulfur as a plant-food solvent.** Soil Sci. 11: 87–92. 1921.—The crop yields on field plots to which inoculated or uninoculated sulphur alone or with greensand marl or rock phosphate were added indicate that inoculated sulphur is more effective in rendering inert mineral plant food accessible to growing crops than uninoculated sulphur.—*W. J. Robbins.*

548. Marchand, B. de C. **Representative Transvaal soils. The Koedoespoort red loam. I.** Jour. Dept. Agric. Union of South Africa 1: 722–727. 1920.—Fertilizer experiments show that this soil is improved by the addition of phosphates, especially basic slag. Potash and nitrogen do not increase the productivity of the soil. Chemical analyses of a number of samples are given and show the soil to be rich in iron and aluminum.—*J. J. Skinner.*

549. Maschhaupt, J. G. **De invloed van grondsoort en bemesting op het gehalte onzer landbouwgewassen aan stikstof en aschbestanddeelen VII.** [The influence of kind of soil and fertilizer upon nitrogen and ash content of agricultural crops VII.] Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. 23: 40–56. 1919.

550. Osbon, C. C. **Peat in the Dismal Swamp, Virginia and North Carolina.** U. S. Geol. Surv. Bull. 711[c]: 41–59. *3 pl.* 1919.—The Dismal Swamp covers approximately 2,200 square miles, of which a little more then 700 have been drained to a depth of 3 feet or more by the Dismal Swamp Canal and smaller ditches. Much of the drained land is farmed. In the remaining 1500 square miles peat deposits ranging in depth from 1 to 20 feet are found. The thickest beds lie in the region east and northeast of Lake Drummond, where peat 18 feet deep was exposed by comparatively recent excavations. The peat in this area is black and low in inorganic impurities and is probably the best in the swamp. In general, the depth of the peat gradually decreases toward the edge of the swamp, where the peat finally merges into the sands of the adjoining areas. It is estimated that the average thickness of the peat is 7 feet and the total available peat in the Dismal Swamp 672,000,000 tons. The peat deposits lie in shallow basins that originated in an extensive depression of the Columbia group of formations.—*J. J. Skinner.*

551. Scheringa, K. **Is chemische denitrificatie van belang voor den landbouw en voor het water onderzoek?** [Is chemical denitrification important for agriculture and the examination of water?] Pharm. Weekbl. 57: 1481–1483. 1920.—Some nitrogenous substances, such as the diazo compounds, easily give off nitrogen on account of the indifferent properties of the latter. Some years ago Marpmann claimed that nitrogen can be liberated from nitroge-

nous substances without the aid of bacteria. Nitrites act on ammonia with the liberation of nitrogen; this action is increased when certain substances like aniline dyes, especially malachite green, fluorescin, or methyl red are present, while it is retarded, and even inhibited, in the presence of colloidal substances. Since well water contains quite a number of organic substances, which act as protective colloids, the simultaneous presence of ammonia and nitrites can be explained. Sterile soil acts like colloids. Some loss of nitrogen may occur in manure, but this loss in only a very slight one.—*H. Engelhardt.*

552. SEN, J. **Report of the Imperial Agricultural Chemist.** Sci. Rept. Agric. Res. Inst. Pusa 1919-20: 31–45. 1920.—An examination of soils of the Pusa farm to determine the effect of various fertilizers alone and in combination on permanent soil fertility leads to the conclusion that "the outstanding feature is the value of a combination of green manure and superphosphate."—Experimental evidence shows that superphosphate is held in calcareous soils by chemical combination, and, since the reaction goes on rapidly, the phosphate is restricted to surface layers of the soil. It is held in noncalcareous soils by adsorption, hence is widely and uniformly distributed through such soil, and is more available for use by the roots of growing plants. "The distribution of the phosphoric acid of those soluble phosphates which are without action on calcium carbonate, through a column of soil is of a uniform type even in highly calcareous soils, and the phosphoric acid penetrates to a considerable depth," suggesting that "such phosphates would be more efficacious than superphosphates in calcareous soils."—Under laboratory conditions, pieces of sugarcane with the cut ends sealed with paraffin, and kept in desiccators, showed slight increase in sucrose content; subsequent wetting causes a fall in sucrose content; these sucrose transformations are similar to those observed in cane windrowed under field conditions and are believed to be closely connected with enzymatic activity.—Repetition of water culture experiments indicates that poor results from cultures previously reported (Pusa Memoir Vol. II, No. 3, Botanical Series) were due to excessive concentration of the nutrient solutions, and not to the excretion of specific toxic substances by the roots.—Periodic analysis of the soil air in a mixed orchard showed the largest CO_2 content in a grassed plot, an intermediate amount in a grassed plot aerated by means of trenches, and least in a plot under surface cultivation. The percentage of CO_2 attains a maximum during the summer monsoon.—In manurial experiments with rice, ammonium sulphate along with phosphates gave increasing yields up to 160 pounds per acre, after which there was a decrease, till with 320 pounds per acre the yield was little better than with no nitrogen at all. Smaller applications of nitrogen increased the proportion of straw to grain; 80–160 pounds per acre gave maximum proportion of grain, and is therefore the most economical application. Green manure alone increased the crop up to 65 per cent, but in combination with ammonium sulphate had little effect. Ammonium sulphate produced an increase in the amount of nitrogen in the grain almost proportional to the amount of sulphate added as fertilizer.—*Winfield Dudgeon.*

553. SHEDD, O. M. **A short test for easily soluble phosphate in soil.** Soil Sci. 11: 111–122. 1921.—A test requiring less than 1 hour to complete is described for testing for easily soluble phosphate in soils. The relative amounts of precipitates are taken to indicate the need of the soil for phosphorous.—*W. J. Robbins.*

554. STEAD, ARTHUR. **The agriculture and soils of the Cape Province, IV and V. Witkop-Burghersdorp.** Jour. Dept. Agric. Union of South Africa 1: 660–670, 819–828. 1920.—Soils from a number of farms in the province were analyzed chemically and mechanically; their fertility is discussed.—*J. J. Skinner.*

555. TOTTINGHAM, W. E., AND E. B. HART. **Sulfur and sulfur composts in relation to plant nutrition.** Soil Sci. 11: 49–73. *Pl. 1–4, fig. 1–2.* 1921.—The changes in acidity, citrate-soluble and water-soluble phosphate, bacterial numbers, and the effects on crop yields of composts of soil or manure with sulphur or with sulphur and horse manure showed appreciable increase in acidity but no increase in citrate-soluble phosphate after 15 weeks. Sulphur

composts of manure decreased the loss of organic matter by fermentation although increased bacterial numbers were maintained. Citrate-soluble phosphate approximately doubled where sulphur was added. On Plainfield sandy loam the yield of oats was as great where sulphur compost was applied as where the treatment included rock phosphate. In greenhouse trials sulphur increased the yield of clover and of the Cruciferae and in field plots increased the yield of seed in barley. Sulphur appears to function as a fertilizer both by oxidation to the nutrient sulphate and by producing an acid condition favorable to the production of available phosphate. It remains to be proved whether the efficiency of sulphur is any greater when it is composted with rock-phosphate and manure than when these materials are added simultaneously to the soil.—*W. J. Robbins.*

556. Walton, J. H. **Report of the Imperial Agricultural Bacteriologist.** Sci. Rept. Agric. Res. Inst. Pusa 1919–20: 109–113. 1920.—A report of progress in the study of (1) nitrification of cow and sheep manures and various oil cakes, both in pot cultures and field plots, and (2) the nitrogen fixing power of various soil microorganisms.—*Winfield Dudgeon.*

557. White, J. W. **Lime requirement of Pennsylvania soils.** Pennsylvania Agric. Exp. Sta. Bull. 164. *36 p., 6 fig.* 1920.—This bulletin is a summary of a lime-requirement survey of Pennsylvania. The results are discussed in terms of $CaCO_3$, or limestone required in pounds per acre to produce an alkaline soil to the depth of 7 inches as determined by the Veitch method. The survey includes a study of 1474 samples of soil taken from 50 counties and represents all of the soil series of agricultural importance. Seventy-two per cent of the soil areas in Pennsylvania were found to be acid, while 85 per cent of the river bottom soils of the state were acid. The average lime requirement of limed soils was found to be 1,749 lbs. per acre as compared to 3,105 lbs. where no lime had been used. No definite relation exists between the lime requirement and the texture of the soils.—The growth of clover and alfalfa in relation to the lime requirement of Pennsylvania soils is shown in the table.

Soil series	Counties	Average lime requirement in lbs per acre	Per cent acid soils	Average tons per county, 1909	
				Clover	Alfalfa
DeKalb	Jefferson, Clearfield, McKean, and Venango	3993	87	22	411
Westmoreland	Greene, Washington, Beaver, and Allegheny	3149	77	93	596
Southeastern Soils	Berks, Chester, Lancaster, York, and Lehigh.	460	25	527	3764

A classification of the important soil series of the state is included.—*C. R. Orton.*

558. Wilson, B. D. **Nitrogen in the rain-water at Ithaca, New York.** Soil Sci. 11: 101–110. 1921.—With an average yearly rainfall of 29.31 inches between May 1, 1915, and May 1, 1920, the soil received annually 12.51 lbs. of nitrogen per acre. Of this amount 11.5 lbs. was in the form of ammonia and 1.01 in the form of nitrates. The rainfall during the spring and summer contained more nitrogen than that of the fall and winter.—*W. J. Robbins.*

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

E. B. Payson, *Assistant Editor*

(See in this issue Entries 14, 86, 113, 233, 234, 345, 380, 461)

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. Livingston, *Editor*
Sam F. Trelease, *Assistant Editor*

559. Anonymous. [Rev. of: Gissing, F. T. **Peat industry reference book.** *xxiv* + *292 p.* Charles Griffin and Co.: London, 1920.] Nature 106: 594. 1920.—The book deals with developments in the industry which have arisen since publication of other books on the subject by the same author. The chief defect of the book is in the description of various processes from the point of view of inventors or exploiters.—*O. A. Stevens.*

560. Anonymous. [Rev. of: Henderson, I. F., and W. D. **A dictionary of scientific terms: Pronunciation, derivation, and definition of terms in biology, botany, zoology, anatomy, cytology, embryology, physiology.** *viii* + *354 p.* Oliver and Boyd: Edinburgh and London, 1920.] Nature 106: 498–499. 1920.

561. Anonymous. **Natuurmonumenten in Ned. Indië.** [Nature monuments in Dutch East India.] Aarde en haar Volkeren 57: 28. 1921.—The Government of Dutch East India has added 7 new areas to be reserved as natural monuments, making altogether 62. Important ones are in the district of Bandjarnegara, where some rare trees, such as *Palaquium Ottolanderi* and *Firminia colorata*, are protected. The Governor of Atjeh has been asked to take steps in the district of Serbadjadi for the protection of *Rafflessia Arnoldi.*—*J. C. Th. Uphof.*

562. Anonymous. **Steigerung des landwirtschaftlichen Ertrages durch Hochofenabgase.** [Increasing yields by use of furnace gases.] Fortwiss. Centralbl. 42: 382. 1920.—This article gives data from a paper in the Frankfurter Zeitung Supplement for March 6, 1920, regarding experiments by Riedel in fertilizing various crops with purified furnace gases, in which the beneficial substance is CO_2. It is estimated that a daily output of 1,000 tons of iron produces enough CO_2 gas to grow 4,000 tons of crops like potatoes, and that enough gas is going to waste in Germany to supply the whole agricultural need.—*W. N. Sparhawk.*

563. Berek, M. **Über die einfachen und zusammengesetzten charakteristischen Konstanten der Mikroskopobjektive.** [Simple and compound characteristic constants of the objective.] Zeitschr. Wiss. Mikrosk. 37: 36–41. 1920.

564. Brenchley, W. E. **The uses of weeds and wild plants.** Sci. Prog. [London] 14: 121–133. 1919.—Weeds and wild plants are used quite extensively in some countries for human food, fodder, fibers, fuel, manures, drugs, dyes, and for miscellaneous purposes.—*J. L. Weimer.*

565. Fyson, P. F. **Editorial retrospect.** Jour. Indian Bot. $1^{9,10}$: [Unpaged insert.] May, 1920.—The success of the 1st year of the Journal of Indian Botany has justified the belief that such a publication is needed in India.—*Winfield Dudgeon.*

566. Groff, Elizabeth H. **Soy-sauce manufacturing in Kwantung, China.** Philippine Jour. Sci. 15: 307–316. *7 pl.* 1919.—A description is given of the plant, utensils, and methods of preparation of sauce from soy beans, flour, salt, and water.—*Albert R. Sweetser.*

567. House, Homer D. **The wild flower preservation idea is one of practical value.** Torreya 21: 17–21. *2 fig.* 1921.—Conservation is necessary, not only of our economic resources but also of those having recreational value. The destruction of plant life causes great damage to animal life also, and makes possible the introduction of noxious weeds. Many of our most beautiful wild flowers are becoming rare as the result of heedless destruction. Education along this line is needed, and the establishment of wild-life reserves is urged.—*J. C. Nelson.*

568. Mackenna, J. **Proceedings of the Board of Agriculture in India. 1919.** *129 p., 1 pl.* Pusa, 1920.—A report of the deliberations at the 11th biennial meeting of the Imperial,

Provincial, Native State and other agriculturists composing the Board of Agriculture in India. Among the subjects discussed are: Necessity for investigation into the conditions of nitrogen fixation in Indian soils; the maintenance of soil fertility under improved methods of agriculture; the advisability of the Agricultural Department undertaking to prepare popular bulletins describing improved methods of agriculture, and school readers containing lessons on agriculture; the conservation of by-products for fertilizer, from various industries; and the permanent experimental plots at the Agricultural Research Institute, Pusa.—*Winfield Dudgeon.*

569. Mackenna, J. **Annual report on the progress of agriculture in India, 1917–18.** *324 p., 4 pl.* Pusa, 1919.—Annual reviewof agriculture throughout British India,by the Agricultural Adviser to the Government of India. Covers much the same ground as the 1918–19 report (see Bot. Absts. 9, Entry 570).—*Winfield Dudgeon.*

570. Mackenna, J. **Annual report on the progress of agriculture in India, 1918–19.** *186 p., 4 pl.* Pusa, 1920.—Annual review of agriculture throughout India, by the Agricultural Adviser to the Government of India. It covers, among other agricultural topics: Agricultural conditions of the year. Scientific research in the agriculture and botany of rice (*Oryza sativa*), wheat (*Triticum vulgare*), cotton (*Gossypium* spp.), sugarcane (*Saccharum officinarum*), fiber plants, indigo (*Indigofera tinctoria*), tobacco (*Nicotiana tabacum*), linseed (*Linum usitatissimum*), sesamum (*S. indicum*), groundnut (*Arachis hypogea*), coconut (*Cocos nucifera*), castor (*Ricinus communis*), tea (*Camellia thea*), coffee (*Coffea arabica*), rubber, fruits, fodder-crops and grasses, potatoes (*Solanum tuberosum*), gram (*Cajanus indicus*), poppy (*Papaver somniferum*), barley (*Hordeum vulgare*), and beans (*Phaseolus lunatus*). Agricultural chemistry of soils, manures, sugarcane storage, indigo manufacture, and miscellaneous. Mycology and plant pathology,—diseases of rice, jute, sugarcane, chillies (*Capsicum* spp.), legumes, tea, coffee, rubber (*Hevea brasiliensis*), palms (*Borassus flabellifer* and *Areca catechu*), and miscellaneous. Agricultural bacteriology,—nitrification, green-manuring, nitrogen fixation, indigo manufacture, pebrine of silkworms, and sterilization of water. Agricultural demonstration and cooperation. Agricultural education. Among the appendices are lists of agricultural stations, agricultural colleges and schools, and of 143 agricultural publications in British India for 1918–19. [See also Bot. Absts. 9, Entry 569.]—*Winfield Dudgeon.*

571. Merk, L. **Das Bezeichnen und Wiederfinden beachtenswerter präparatestellen. [Marking and relocating of important points on slides.]** Zeitschr. Wiss. Mikrosk. **37**: 42–45. 1920.

572. Metz, C. **Apertometer für Trockensysteme und Ölimmersionen. [Apertometer for dry systems or oil immersion.]** Zeitschr. Wiss. Mikrosk. **37**: 53–54. 1920.

573. Metz, C. **Der makroskopische Zeichenapparat. [Macroscopic drawing apparatus.]** Zeitschr. Wiss. Mikrosk. **37**: 55–58. 1920.

574. Milligan, S. **Review of agricultural operations in India. 1919–20**: 1–140. *3 pl.* 1921.—This is the annual report of the Agricultural Adviser to the Government of India. Previous reports have appeared under the title "Progress of Agriculture in India." The report gathers together and summarizes the work of the imperial and local provincial agricultural departments during the year under review, and deals with: Agricultural conditions of the year; economic work on the more important crop plants; research and investigation in soils, fertilizers, windrowing of sugar cane, prussic acid in *Andropogon sorghum*, diseases of crops, insect pests, useful insects, and miscellaneous; agricultural engineering; district work; agricultural education; the cooperative movement as affecting agriculture; diseases, inoculation, and breeding of live stock, and veterinary education and research; publications of the imperial and provincial agricultural departments; and expenditure on the various agricultural departments. In 6 appendices are given special data for the year: A list of the agricultural stations in British India; a list of the agricultural colleges; operations of non-credit agricultural co-

operative societies; working of provincial civil veterinary departments; students in the veterinary colleges and schools; and a list of 153 publications put out by the various agricultural departments during the year.—*Winfield Dudgeon.*

575. MILLIGAN, S., AND G. S. HENDERSON. **Report of the Director.** Sci. Rept. Agric. Res. Inst. Pusa **1919–20**: 1–9. 1920.—The report includes a statement of the staff in charge; a brief summary of the scientific work undertaken in various sections of the Institute; and a statement concerning the publications from the Institute during the course of the year under review.—*Winfield Dudgeon.*

576. SCHMEHLIK, R. **Polarisation im binokularen Instrument.** [Binocular polarization.] Zeitschr. Wiss. Mikrosk. **37**: 136–137. 1920.